

AUGUST, 1942

ANNUAL CEMENT ISSUE

Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

B&W Pulverizer
Type E,
one of five
in an eastern
cement plant

B&W PULVERIZERS
FOR DIRECT FIRING
*... are an important aid in
modern cement manufacture*

THE BABCOCK & WILCOX CO. 85 LIBERTY STREET, NEW YORK, N. Y.

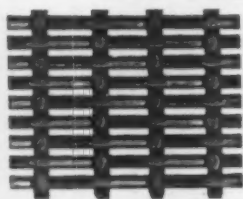
BABCOCK & WILCOX

LUDLOW-SAYLOR CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

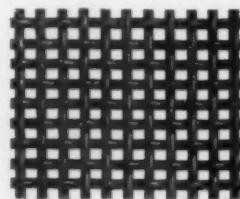
for super-severe service

SUPER-HARD, SUPER-TOUGH, SUPER-STRONG CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

withstand abrasion longer —
endure vibration better —
resist fatigue to the utmost



REK-TANG
long-slot
weave



DOUBLE-CRIMP
square-mesh
weave

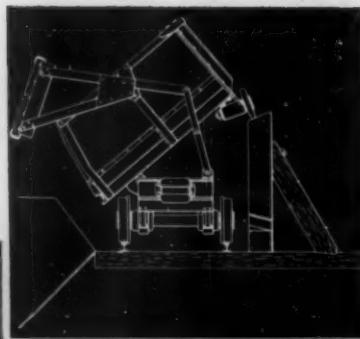


The background at top of page shows the "Perfect" Double-Crimp Weave.
The small cuts in the center panel compare REK-TANG Weave and Double-Crimp Weave.
The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.
Samples on request.

The **LUDLOW-SAYLOR**
WIRE COMPANY
SAINT LOUIS

EASTON GRANBY CARS

A fundamentally sound design which combines low overall height with large capacity for mine haulage. One of many Easton mine car designs, the Granby is moving mountains of ore daily in iron, lead, zinc, limestone and other underground mining operations. Diagram at left shows how Granby car is dumped automatically when roller at back rides over the inclined rail. Easton designs and installs the complete system.



Keep moving with **EASTON**

It is *your* job to keep mountains of earth, ore and rock moving from where they are to where they are needed in the War Production Program. It is *our* job to help you to design track or trackless haulage equipment to fit your requirements, to adapt the design to the

availability of materials, and to follow each order through to earliest possible delivery. May we get to work on your haulage problem *now*—to help you achieve your desired capacity at lowest cost per ton? Write to Easton Car & Construction Company, Easton, Pa.



The famous EASTON Phoenix Quarry Car. Doorless. 2-way dump. Timken Bearings.



EASTON Cornwall Mine Car. With automatic downfolding door. Timken Bearings.



The EASTON TR-15H Trackless Mine Car. A matchless record in quarry service.

Rock Products

Recognized the World Over as the Leader in Its Field

With which have been consolidated the journals *Cement and Engineering News* (founded 1896) and *Concrete Products* (established 1918)

VOL. 45, No. 8, AUGUST, 1942

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*Contractor
writes:*

"TRUCKS CLEARED AND CLEANED READILY...
FORMS STRIPPED CLEANER...
WITH **POZZOLITH** (CEMENT
DISPERSION)"

BURDINE CONSTRUCTION COMPANY
SHAW, MISSISSIPPI

April 6, 1942

The Master Builders Co.,
7016 Euclid Avenue,
Cleveland, Ohio.

Gentlemen:-

You may be interested in learning what our experience was with Pozzolith, cement dispersion material, on the Ordnance Depot at Milan, Tenn. where we supplied approximately 200,000 cubic yards of concrete. In approximately 40,000 cubic yards of this we used your Pozzolith.

It took about 12-15% less water to give the specified slump, yet we noticed that the concrete mixed as fast or faster, cleared the trucks readily, and the trucks cleaned easier at the end of the run.

We noticed that placing in the forms was helped by the good consistency of the mix and work stripped easier with less bleeding and segregation. Strengths ran higher.

Yours very truly,
Burdine Construction Company,

J. H. Burdine
J. H. Burdine-Owner.



Find out how Pozzolith reduces ready-mix costs 15 to 30 cents per yard. Write for illustrated booklet which tells how Cement Dispersion produces greater placing speed, workability, watertightness and durability.

THE MASTER BUILDERS CO.
CLEVELAND, OHIO TORONTO, ONTARIO

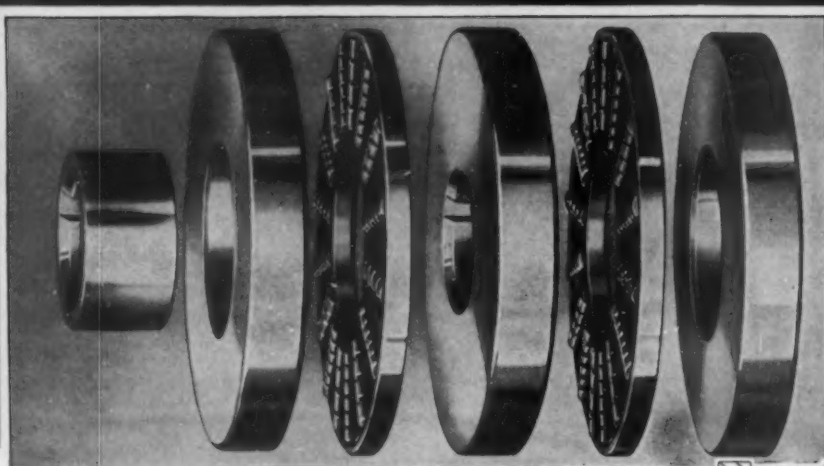
MASTER  BUILDERS

Sure, They'll Carry Heavier Loads at Higher Speeds because

ROLLWAYS carry ONLY ONE* load!

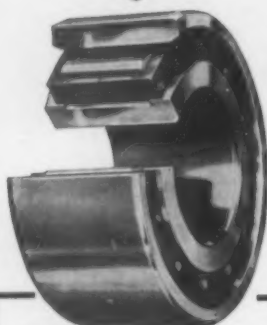
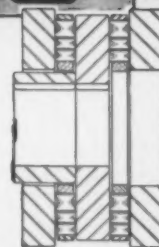
*Only One
Load...
THRUST!

*Only
One
Load
RADIAL!



Type DT Double-Acting THRUST bearing

Their right-angled loading helps to Solve the maintenance problems of the 3-SHIFT, 168-HOUR WEEK!



Type MCS
Double Width
RADIAL bearing

STANDARD SIZES FOR MOST APPLICATIONS

Rollway's large number of types and series permit designing to standard metric sizes that are not only correct mechanically and practical from a cost viewpoint, but that are easier to obtain and replace, particularly in times of emergency like these. Send us your designs for free bearing analysis and "engineered to the job" recommendations.

ROLLWAY

BEARING COMPANY, INC., SYRACUSE, N. Y.

BUILDING HEAVY-DUTY BEARINGS SINCE 1908

BEARINGS

It's a common error to overlook the destructiveness and magnitude of *thrust* loads—particularly when thrust is not the main component of the load. But whether uniform or variable . . . whether the result of shock, vibration or reversal of torque . . . thrust can seriously affect the life and service of a bearing and of a machine.

That's why Rollway carries every thrust load on a *separate* bearing assembly of solid cylindrical rollers. Load per roller is lower. You get greater roller cross-section per unit of load . . . and greater ability to absorb shock, vibration and wear.

More—you get rid of all oblique and compound stresses with their bothersome resultants. And you get in *thrust* bearings the factors of safety, life expectancy, and low starting torque that you expect in radial bearings.

For longer wear, less service attention and fewer shut-downs, change over now to Rollways, the roller bearing with right-angled loading.

SAVE

*up to 40 minutes
per day per truck!*

Defense construction of all kinds needed in a hurry! This Rex Hi-Discharge Moto-Mixer is one of countless Rex's filling this need on defense projects all over the western hemisphere.



A SAVING of 40 minutes per day per truck means a lot these days on any ready-mixed job. And that's what Rex Moto-Mixer users are getting these days, thanks to *quick-as-a-flash end-charging*. Rex has eliminated the time-wasting charging door of ordinary truck mixers and the need for having truck operators leave their cabs during charging operations. This alone saves as much as 5 minutes a batch!

This alone is the reason why fleet operators are standardizing on Rex. This alone would be reason enough why you

should standardize on Rex in your own fleet—but there are others, too.

For instance, the Rex Hi-Lo mixing action means faster and more thorough mixing; and the handy Rex Quint-Spout makes discharging easier, under all conditions.

You'll get a new slant at what a truck mixer can offer you in the way of speed and economy on today's ready-mixed jobs, if you send for the Rex Hi-Discharge Moto-Mixer Catalog. Just address 1649 W. Bruce St., Milwaukee, Wisconsin.



MOTO-MIXERS

HI-DISCHARGE AND CONVENTIONAL TYPES

CHAIN BELT COMPANY OF MILWAUKEE



+ one day = one 18 foot hole



+ one day = six 19 foot holes

Drilling with Timken Bits at quarry of Stowe-Fuller Refractories. Average number of feet per Timken Bit use 6; number of regrinds per bit 3.

Here's an
answer to a war-
time prayer and to
your post-war
competition.



Two years ago the Stowe-Fuller Refractories Company's quarry in Huntingdon County, Pennsylvania drilled with bits forged as an integral part of the drill steel. At least one day (and sometimes part of another) was required to sink an 18 foot hole.

For the last two years Timken Bits have been used. The results; six 19 foot holes per day! Same equipment, same number of drillers, same everything except bits—and what a difference!

In the face of this record and hundreds of others, can you, being honest with yourself and the company you work for, delay trying Timken Bits any longer if you are not already using them?

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN

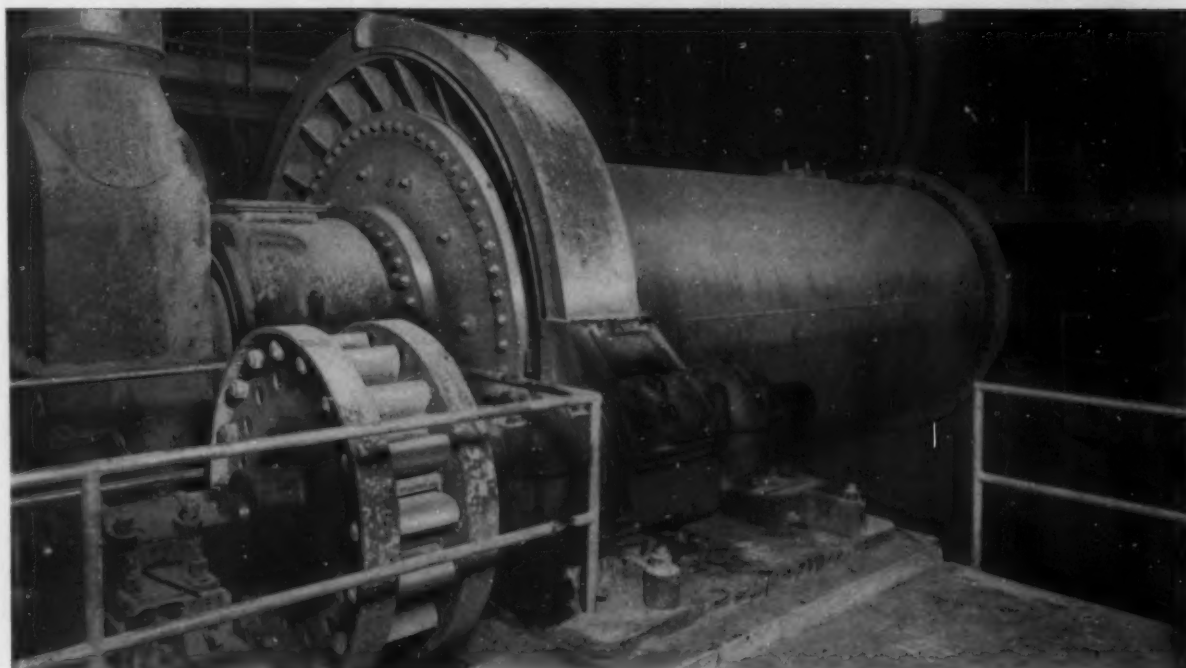
TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS



TRAYLOR

COMPARTMENT MILLS



WE BUILD

Rotary Kilns
 Rotary Coolers
 Rotary Dryers
 Rotary Slakers
 Scrubbers
 Evaporators
 Jaw Crushers
 Gyratory Crushers
 Reduction Crushers
 Crushing Rolls
 Compartment Mills
 Ball Mills
 Rod Mills
 Tube Mills
 Pug Mills
 Wash Mills
 Feeders
 Rotary Screens
 Elevators

One of the very first units of equipment built by Traylor, at about the turn of the century, was a ball mill for a mining company, and its performance, together with that of its successors, was so profitable to users that Traylor Grinding Mills have been highly regarded and eagerly purchased ever since. It was most natural therefore, that, with such a background of experience, when Traylor Compartment Mills were introduced, they should be accepted and approved at once by industries whose paramount requirements are always highest rate of pro-

duction at the lowest attainable cost.

We have achieved these successes because our engineers are ever on the alert to anticipate developments in process industries, so as to be ready, always, to design improved equipment to meet new requirements. Cement manufacturers, and others having difficult grinding problems, are invited to use the services of these engineers liberally. They are available to prospective purchasers at any time.

We can still make reasonable delivery to clients able to convince the Government as to the urgency of their need.

WRITE FOR DETAILS

TRAYLOR

ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

NEW YORK CITY
3416 Empire State Bldg.

CHICAGO
2051 One La Salle St. Bldg.
B. C. EQUIPMENT CO., LTD.
551 Howe St., Vancouver, B. C.

SALT LAKE CITY
101 West Second South St.

LOS ANGELES
919 Chester Williams Bldg.
MANILA MACH. & SUPPLY CO., INC.
Manila and Baguio, P. I.

SEATTLE
6311-22d, Ave. N. E.

Export Department—104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Oruro, San Juan, P. R.

AUGUST, 1942

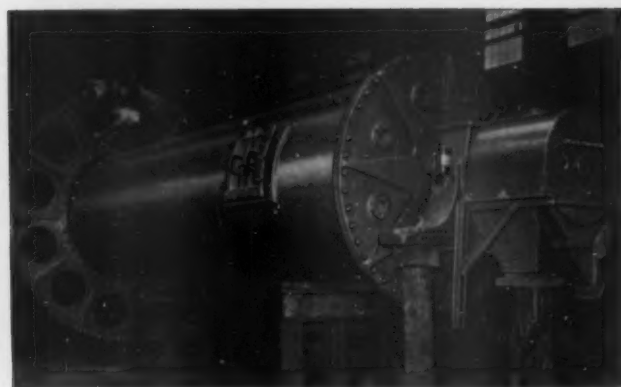
7

11 MILES OF speed

SECTION OF THIS HEMISPHERE'S LONGEST KILN—11'6" x 475'
— for a midwestern cement plant. Welded construction gives greater strength with less weight . . . longer life with less maintenance.



AS HIGH AS 200,000 BTU PER BARREL OF CLINKER ARE SAVED with the famous, modern Allis-Chalmers air quenching clinker cooler.

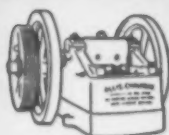


OVER 3500 ALLIS-CHALMERS CYLINDRICAL GRINDING MILLS are now in service. Shown is an all-welded Ballpeb mill, one of the 30 different types of mills engineered and built by Allis-Chalmers.



Get "All Out" production with

ALLIS-CHALMERS



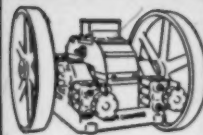
Jaw Crushers—Primary and Fine Reduction



Large Gyratory Crushers Up to 60 in.



Type "B" Crusher with "Speed-Set" Control



Crushing Rolls for Granular Products



Pulverators (Multi-impact Hammer Mills)

ALLIS-CHALMERS KILNS war production!

300,000 Barrels per Day Capacity of Allis-Chalmers Rotary Kilns in Service Equals Almost 2/3 of Peak U. S. Output.* Here Are the Facts on How Allis-Chalmers Cooperative Engineering Service Helps Increase Cement Production!

ELEVEN MILES OF KILNS BUILT! An active capacity of 300,000 barrels per day! That's the part Allis-Chalmers is playing in the vast production program designed to overwhelm the Axis.

Since 1899, when our first 6' x 60' kiln was built, up to the recent 11'6" x 475' giant—among the world's largest — Allis-Chalmers Cooperative Engineering has been working with the cement industry . . . improving both the mechanical and thermal efficiency of these machines. Allis-Chalmers developments include welded steel riding rings of the floating type . . . forged steel rollers . . . constant reaction supports . . . the first large two-support kiln . . . air-cooled feed and discharge ends . . . X-ray examination of welded joints.

In coolers, too, Allis-Chalmers has pioneered. The

*1928 production — 176,000,000 barrels.

famous air quenching clinker cooler saves up to 200,000 Btu per barrel of clinker . . . increases finish mill capacity as much as 25% . . . gives a stronger, lower-expansion finished cement. And modern control — coordinating kiln and cooler operation — permits precise combustion control.

What's more, unit multi-stage grinding — reducing kiln-run clinker to finished cement in one machine — is another contribution of Allis-Chalmers Cooperative Engineering. Over 3500 Allis-Chalmers cylindrical grinding mills are now in service. And, because we build over 30 different types, you can be sure you get the right mill for your particular requirements.

The next time a production problem comes up in your plant, remember you can put our vast facilities and experience to work for you. Call on Allis-Chalmers Cooperative Engineering service for the answer to war-time production troubles.

There's a trained engineer in the district office near you. Get in touch with him, or write direct to Allis-Chalmers, Milwaukee, Wisconsin.

A 1550

COOPERATIVE ENGINEERING



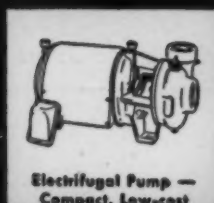
Low-cost, High-capacity
Ripl-Flo Screen



Kilns, Coolers, Dryers
for Cement and Lime



Cylindrical Grinding Mills
— 30 Different Types



Electric Pump —
Compact, Low-cost



Low-Maintenance Motors,
Texrope V-Belt Drives



**"With Gulf Lubricants
we get dependable
performance from
our equipment at
rock-bottom cost"**

SAYS GENERAL SUPERINTENDENT

"Month in and month out—over a period of 15 years—we have kept our maintenance expense low and have avoided major mechanical troubles by closely following Gulf Engineering recommendations."

"FOR 15 years we have enjoyed rock-bottom maintenance costs and freedom from major mechanical troubles, thanks in large part to good lubrication with Gulf quality oils and greases," says this General Superintendent. "Judging from our experience, I would say that Gulf lubricants have more 'guts'—they stand up longer and do a better protection job under quarry and crusher plant operating conditions."

There are good reasons why quarry and crusher plant operators report important benefits with Gulf higher quality lubricants in service. These lubricants are scientifically manufactured from selected crude oils to the most rigid specifications for stability and endurance. Thus they provide a tough long-lasting film that insures minimum wear for vital parts and

helps to maintain equipment in good operating condition at all times.

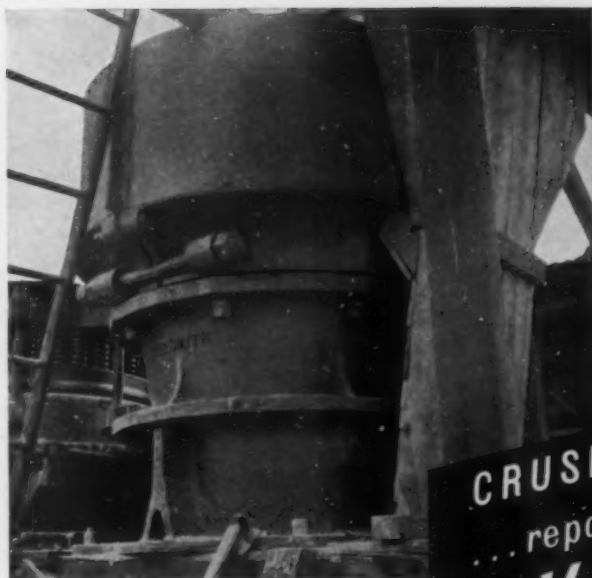
Your plant or quarry, too, should get the benefits of the best lubrication practice. Call in a Gulf engineer now and let him help you find the opportunities for improved production and lower maintenance costs. His thorough training and broad practical experience with equipment similar to yours can go right to work for you as soon as you say the word.

The services of a Gulf engineer—and the Gulf line of 400 quality oils and greases—are available to you through 1200 warehouses in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

**GULF OIL CORPORATION • GULF REFINING COMPANY
GULF BUILDING • PITTSBURGH, PENNSYLVANIA**



OIL IS AMMUNITION — USE IT WISELY!



13-B Tel Smith Gyratory Crusher

RALPH E. MILLS, of Roanoke, Va., who heads the general highways contracting firm bearing his name, owns the completely modern Tel Smith-equipped Arlington Stone Co. plant at Leesburg, Va. He not only knows highway construction and materials, but the kind of quarry plant equipment best suited to turn out crushed stone for highway construction.



CRUSHING 190,595 TONS
... repair parts and labor cost
1/10¢ per Ton
WITH THIS
TELSMITH
CRUSHER

Has Mr. Ralph E. Mills' choice of Tel Smith equipment for his own quarry plant been justified by results? Let's look at the record of the 13-B Tel Smith Gyratory Crusher. Used as an intermediate crusher for plus 2½", it takes the feed from the primary at 80 to 90 tons per hr.

From the start of plant operations, Sept. 1, 1939, to Dec. 31, 1941, this Tel Smith Crusher worked 3,941 hours, and crushed 190,595 tons. Repair parts cost \$126.77. Labor charged to crusher maintenance: \$55.73. Total crusher upkeep for 16 months: \$182.50—less than 1/10¢ per ton! And the stone crushed is particularly hard and abrasive.

"Cost of lubricating oil is not included," says Mr. Mason M. Schoolfield, Plant Supt. "The figures do include all manganese costs—because there haven't been any. It is still operating with the original concaves and mantles. We bought two sets of concaves, one standard, the other extra thick to make smaller stone . . . the extra thick set has operated about four-fifths of the time. Both sets are still in good condition. The largest single item in the above cost figures was not crusher parts at all, but a new set of V-belts. In view of the type stone we are handling here, I think the figures are very remarkable!" You can get results like this in your plant—with Tel Smith equipment! Get Bulletin Q-11.

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London
Room 1604—50 East 42nd St. New York City
211 W. Wacker Drive Chicago, Ill.
713 Commercial Trust Bldg. Philadelphia, Pa.
19-21 Charles St. Cambridge, Mass.
Blake Equipment Co. Columbus, Ohio
Brandeis M. & S. Co. Louisville, Ky.
Charleston Tractor & Eqpt. Corp. Charleston, W. Va.
Roanoke Trac. & Eqpt. Co. Roanoke, Va.
North Carolina Eqpt. Co. Raleigh and Stateville, N. C.
Wilson-Weesner-Wilkinson Co. Knoxville and Nashville, Tenn.
G. F. Seeley & Co. Toronto, Ont.

Q-7



Minus 2½" material passing grizzly, and discharged from 13-B Tel Smith Gyratory Crusher, drops onto 28" x 35" Tel Smith Belt Conveyor, is carried to Tel Smith No. 7 Belt Elevator with 43" centers and goes up to two 4' x 10' Tel Smith Pulsator Screens (left) over storage bins. Any one of the five finished products can be re-conveyed from bins to the Tel Smith No. 36 Gyrasphere Crusher (right, with Tel Smith Gyratory on extreme right) for re-crushing into ¾", ½" or ¼" chips.



Now they're making
RAINCOATS
out of stone



OUT of pits like these comes limestone and when this product is combined with coal and salt it forms a chemical called polyvinyl chloride.

Not so long ago scientists in an Ohio rubber factory discovered that the mixture of this chemical with a softening agent known as plasticizer would produce a synthetic elastic material that was similar to rubber—was absolutely water proof and extremely light weight. From that point, it was only a short step to the processing of this synthetic into such things as raincoats.

Lorain shovels play an important part in

this story of "raincoats out of rock"... and in every other job where a *real* rock shovel is needed. Every Lorain is built to Center Drive design for direct-to-the-point power application; maximum working capacities per pound of weight; and a simplified construction which uses fewer but stronger parts. They can and do dig more rock, faster and at lower cost.

That's why Lorains have gained the confidence of contractors from coast to coast.

THE THEW SHOVEL COMPANY
LORAIN, OHIO



THEW-LORAIN

CRANES • SHOVELS
DRAGLINES • MOTO-CRANES

War on *Wear!*

MANHATTAN'S Suggestions for the Care of V-BELTS

Rubber has so many essential applications in the war production program that scarcity must be overcome by conservation in every way possible.

Making V-Belts last longer is more than common sense; it is a patriotic contribution to the "winning-power" of the country. Follow these important suggestions:—

1. Do not allow oil, grease or gasoline to come in contact with belt.
2. Avoid exposing belts to sunlight and excessively hot or cold weather.
3. Provide take-up facilities.
4. Don't leave tools or other objects near belt to get caught in drive.
5. Avoid abrasion on nearby objects.
6. Do not force belts onto sheave with instruments of any kind. Slack off on take-up and place belts into grooves.
7. Work belts around grooves until all of the slack is on **ONE SIDE OF THE DRIVE**, then tighten take-up until belts are fairly snug.
8. Before starting check pulley alignment, check bearings for oil and see that drive is clear and free. Adjust take-up so that when drive is operating at full load and full speed, only a slight bow appears on slack side. Vertical drives, extremely short center drives, and drives carrying pulsating loads must be operated tighter than others.
9. Use sufficient number of correct sized belts to handle maximum load. Be sure sheaves are over accepted minimum diameters.
10. Design new drive to take standard belt and sheave sizes.
11. Belts must not bottom in grooves. Bottoming causes belt-destroying heat from slip.
12. Do not use belt dressing. If belts slip, clean with cloth dampened in gasoline and tighten drive slightly.
13. See that sheave grooves are free from burs and extreme wear. Replace worn sheaves and check alignment periodically.
14. On failure of first belt on a drive, replace entire set with new belts, keeping worn belts as spares for subsequent failures.
15. Store belts uncoiled and hung over forms on rack or wall in a cool, dark place.
16. Consult your MANHATTAN service man. Write factory or your distributor.

You can get reprints of these suggestions for maintenance men from MANHATTAN field representatives or distributors or by writing direct. This is No. 3 of a series on rubber conservation. Wall cards on care of belts and hose are also available.

V-Belt destroyed by insufficient tension. High slip created excessive heat which wore and cracked cover.

KEEP AHEAD WITH



Conserve your rubber equipment; salvage worn out rubber and buy WAR BONDS—three steps to Victory.

THE MANHATTAN RUBBER MANUFACTURING DIVISION
of RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES PASSAIC, NEW JERSEY



9,000,000 TONS

THAT HEAVY MEDIA SEPARATION

CAN PRE-CONCENTRATE mill feed at low cost to permit larger metal output from present equipment

CAN PROVIDE the most economic process for grading-up sub-ore or waste products hitherto considered too low-grade for profitable treatment

CAN PRODUCE savings in costs and increase output by permitting less selective mining methods

CAN PREPARE directly a marketable concentrate on certain ores.

AMERICAN CYANAMID COMPANY

OF PROOF

THIS YEAR over nine million tons of ore will be beneficiated by Heavy-Media Separation (Sink-Float) Processes!

These methods of concentration are now being used to treat substantial tonnages of Lead-Zinc, Zinc, Tin, Garnet and Cuyuna and Mesabi Iron ores. Continuous test-unit results on Magnesite, Copper, Tungsten, Topaz, Manganese, sideritic and brown iron ores (some of which already are being translated into actual plant designs) demonstrate that Heavy-Media Separation has wide applicability. This diverse list by no means exhausts the types of ore which may be economically treated by Heavy-Media Separation.

When designed from experience gained on large-scale operations after adequate test work in a properly equipped ore dressing laboratory, Heavy-Media Separation plants can be built quickly and inexpensively. Because a variety of media—ferrous and non-ferrous—can be used, Heavy-Media Separation Processes offered by Cyanamid have great scope and flexibility of operation. The use of ferrous media even permits the treatment of those

ores having a high slime content which would excessively contaminate non-ferrous media.

Whether you operate an old plant in competition with new mills or a new plant built primarily to satisfy war-born demands for increased metal output, Heavy-Media Separation added to your present flow scheme *now* may provide the economies that will keep your property from becoming a marginal producer in post-war metal markets. Present users of froth flotation in particular, may find that the addition of Heavy-Media Separation for pre-concentration can make a worthwhile reduction in the overall cost of metal produced.

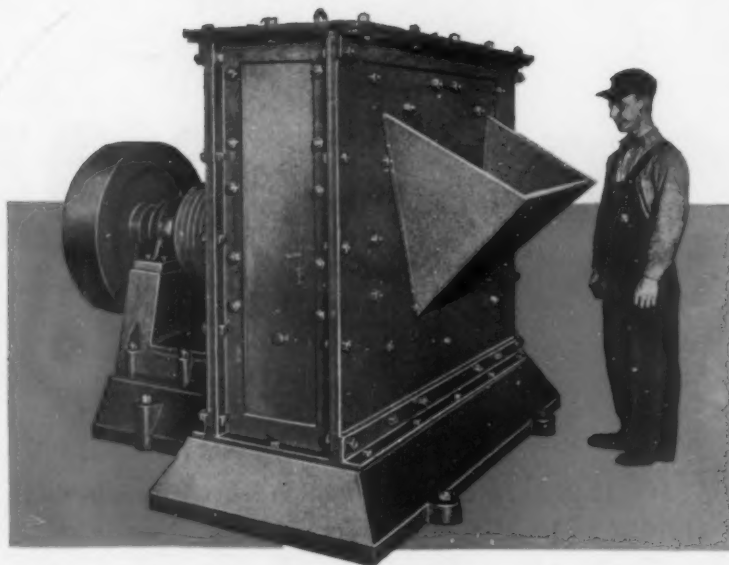
To determine the economic application of Heavy-Media Separation, alone or in combination with froth flotation or other processes, Cyanamid offers the entire mining industry the services of the Cyanamid Ore Dressing Laboratory, the experience of Cyanamid Field Engineers and its practical operating background gained in treating millions of tons of diverse ores by these processes.

A new edition of Ore Dressing Notes—now on the press—describes Heavy-Media Separation Processes offered by Cyanamid. A copy will be sent on request.

30 ROCKEFELLER PLAZA, NEW YORK

Produces
Thoroughly-CRUSHED,
CUBICAL-SHAPED
PARTICLES . . .

Free from
FLATS or SLIVERS



Another Prominent Producer . . .

MELVIN STONE CO. (C. C. BEAM), Melvin, Ohio

Installs Two (2) STEDMAN IMPACT-TYPE SELECTIVE REDUCTION CRUSHERS

Now you can meet the most exacting specifications for aggregates—the cubical particle shape that engineers desire for better concrete—in just one operation, with the STEDMAN IMPACT-TYPE SELECTIVE REDUCTION CRUSHER. The product will be clean, uniform and thoroughly crushed with the maximum percentage of required sizes. You can easily install one in your plant with minor changes at little expense.

The STEDMAN IMPACT-TYPE SELECTIVE REDUCTION CRUSHER is a Selective Crusher approved for the reduction of any size material between 3" and $\frac{3}{4}$ ". Used for primary or secondary crushing—depending on the feed and size of product desired.

CRUSH FINER AT GREATER CAPACITY WITH LESS POWER

REDUCE SURPLUS MATERIAL OF ANY SIZE TO HIGHER QUALITY FINE CRUSHED MATERIAL

PULVERIZE UNSOUND MATERIAL, TO BE PASSED OFF WITH FINES, LEAVING HARD CLEAN PARTICLES

PRODUCE 50% to 100% CRUSHED AGGREGATES — TO MEET PRESENT DAY DEMANDS

Available in four sizes with range of capacities from 10 to 250 tons per hour. Horsepower requirements from 15 to 100.

STEDMAN IMPACT-TYPE SELECTIVE REDUCTION CRUSHERS

The Ideal REDUCTION CRUSHER for Limestone, Gravel, Granite and similar materials used for aggregate

Write for Bulletin No. 510 for further details.

STEDMAN'S FOUNDRY & MACHINE WORKS General Office and Works
AURORA, INDIANA, U. S. A.



Feeding War Dogs

ANOTHER JOB FOR WICKWIRE ROPE

We'll be glad when it's over . . . when Wickwire rope can get back to the jobs of a world at peace.

The quickest way from here to there is for us, and for you, each day *now*, to put everything we have into winning.

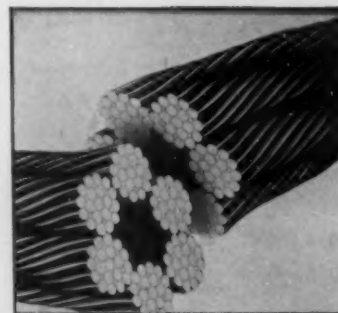
We are doing it by working day and night, seven days a week, on Wickwire Rope for our shipyards, our Liberty Fleet, the army, marine corps, coast guard and navy . . . and for industries whose production is so urgently needed.

You are contributing when you take care of your wire rope, making it last longer . . . so that there is more available for war needs.

But when you *must* have new wire rope,

for war production or for essential services, ask your distributor for long-life *Wickwire* Rope. Both Wickwire regular lay and pre-formed *Wissco* Lay have quality that has made them famous for *low cost per year of use*. We put that into Wickwire rope by controlling every step from ore pile, through blast furnaces, open hearths, precision wire drawing, and skillful laying of the rope.

A FREE BOOK, "Know Your Ropes," is waiting here for you. More than 25,000 wire rope users all over the world consider this a bible on the selection of wire rope—and *making it last longer*. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York, N. Y.



REVERSE ROPE FOR LONGER LIFE

Frequently, most severe strain, due to close bending, occurs near one of the ends. Rope life is increased by exchanging the drum end with the load end. This and forty more rope life-savers are fully described in the free book, "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER



WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City





needed NOW

Iron and steel scrap is used in enormous quantities in making new steel. The steel industry is now in urgent need of scrap to keep the mills operating—to keep war materials moving steadily to American fighting forces and to our Allies.

It is of vital importance to everyone to see that all iron and steel scrap is salvaged now and sent on its way to the mills. Your contribution—much or little—is needed to help swell the total to the necessary volume.

This appeal is not for ourselves alone. Much of the scrap you contribute will be allocated by the Government to be used wherever needed most.

Salvage Anything Made of Steel or Iron

The mining and quarrying industries can be of real assistance in relieving the

present scrap shortage. Anything made of iron or steel is valuable as scrap—abandoned trackwork, broken car wheels, pipe, any metal equipment that is worn out or obsolete. Comb your premises for such material.

Time is short. The need is urgent. Put your scrap to work for your country—*now!*

What to Do With It

To get your scrap on its way to the steel mills, sell it to a junk dealer, or get in touch with your local Industrial Salvage Committee. Many organizations have appointed someone to be in charge of salvage—someone who has authority to order the scrapping of material not in actual use, or material which will go out of use in the near future. In this way, available scrap can be located and disposed of most efficiently.



TO KEEP WAR MATERIALS MOVING

Rock Products

309 WEST JACKSON BOULEVARD
CHICAGO, ILL.

August 1, 1942

Dear Subscriber:

Washington, D.C.: According to the Department of Labor the average hourly earning of wage earners in manufacturing industries in May 1942 was 14.5 percent higher than one year ago. The War Labor Board recently decided wage earners in the steel industry were entitled to an increase of 44¢ per day because the cost of living has increased 15 percent since January 1, 1941. The power behind both the Department of Labor and the War Labor Board refuses to recognize the connection between these two increases. The cost of living lags a little behind the increase in wages, but eventually it will be the same, for in the final analysis the cost of any commodity is the cost of labor expended on it and, since all labor is not organized to get its share of the increase, it is obvious that the selfish groups who are organized are getting a great deal more than their fair share.

Washington, D.C.: A way out of contracts made at "distress prices," which have caused rock products producers much worry, is apparently supplied by Amendment 14 to the General Maximum Price Regulation of the Office of Price Administration, issued July 19, which reads in part as follows: "Any seller, other than a seller at retail, whose maximum price for a commodity to purchasers of a particular class is based on a 'special deal' given by him to such purchasers which he can demonstrate was to have terminated not more than 123 days from the date on which it first became effective, may adjust his maximum price to such purchasers to the highest price at which such commodity was delivered by him to a purchaser of that class during the 30 days immediately preceding the date on which the special deal first became effective."

Washington, D. C.: Nothing shows clearer the muddled thinking by administration leaders than the continual harping that living standards cannot be maintained under war conditions, and the advocacy of increasing wages to maintain the present standard of living of wage earners, all at the same time. The only possible answer is that all the sacrifice in living standards must be made by those who do not belong to pressure groups. And it is not fair to many patriotic citizens who belong to labor unions or are farmers, to place them necessarily thereby in favor of pressure groups or the methods being adopted by leaders of pressure groups. The great awakening is coming when politicians find out that the majority of Americans are patriots first and union members second.

Chicago, Ill.: In order to conserve steel plate, it is understood that plans are under way to build gasoline storage tanks in the East of reinforced concrete. Some sort of inner surface treatment will probably be used to prevent loss of gasoline through the concrete wall. This is but one of many instances where concrete has been found a suitable replacement for critical materials since the war began.

The Staff

Ottawa, Canada: Having avoided formal priority systems for almost three years, Canadians are now pitchforked into the toils and meshes of the U. S. Production Requirements Plan.

On July 10, all purchasers of goods and commodities in Canada were placed on the Allocation Classification System and required to mark purchase orders or contracts with the identical "end use" symbols that appear on United States orders. Canada calls her end use code "Priorities Order No. 1." It is almost word for word the same as Priorities Regulation No. 10 issued by WPB. The U. S. symbols now apply to all Canadian business transactions (above the retail level) whether they involve U. S. materials or items of purely Canadian origin.

This means that there will no longer be any Canadian designations even for orders placed in Canada by the Canadian armed services. All war business placed in Canada under the new system, whether requiring U. S. components or not, will henceforth be labelled with the U.S. end use code symbols, namely: USA, USN, LL, FP, etc. The manufacturer in Wisconsin, Winnipeg, New York or Montreal will not know whether he is handling materials or components for the U.S. Army or the Canadian Army. In fact, if the British government places orders in Canada other than with the central buying office (Canada's Department of Munitions and Supply) they will be stamped "FP" (Foreign Purchaser).

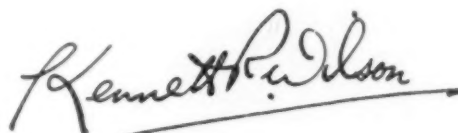
The advantage of this plan is that it removes the possibility of discrimination against orders placed in Canada which require metals, components, sub-assemblies or other materials from the U.S. It is quite the most far-reaching step ever taken by the two countries to mesh production and resources, and means that Canadian business firms will be looking more than ever to Washington to get help and guidance in working out common priority and allocation problems.

Prior to introduction of the end use code, an attempt was made to make PRP mandatory in Canada. This was about the same time it was introduced on a mandatory basis in the United States. It wasn't possible to meet the U.S. deadline, so the present program calls for all Canadian prime contractors and users of raw metals in excess of \$5000 quarterly, to get aboard PRP by August 1.

Here, again, the Canadian application forms are identical with the U.S. So every simplification in U.S. procedure will bring a big sigh of relief on this side of the 49th parallel. About a third of the big war contracting firms in Canada were already operating under PRP prior to July 1. The rest are being required to conform by August 1.

As Americans ponder the type of tax bill which will finally emerge from Washington, the example set by Canada a few weeks ago in its 1942-43 fiscal year is impressive. Normally, Canada's federal government spends \$400 or \$500 millions a year. The 1942-43 budget calls for total spending of \$3.9 billions. In terms of relative national income, this represents a U.S. expenditure of almost \$60 billions. The total includes \$2.3 billions of direct war expenditure, and \$1 billion, the gift of munitions and supplies being made by Canada to Great Britain.

The confiscatory tax measures which Finance Minister Ilesley introduced along with his budget place a levy of more than \$2 billions on Canadian citizens and corporations. Thus, Canada will collect 53% of war and other costs by income, corporation and other taxes.



Staff Correspondent, Ottawa, Canada



Knee-deep in trouble...with pleasure!

IT IS A COMMON SIGHT to see Mack trucks do things that, for most trucks, would be near-miracles. Why does this happen so often?

The reason is simple. *A Mack is more truck to begin with.* We do not build Macks just to stay even with somebody else, but to be beyond all doubt or question the *best* trucks in the world. *And an unequalled record stretching back over forty years says that's exactly what Mack trucks are!*

Mack Trucks, Inc., Long Island City, N. Y.



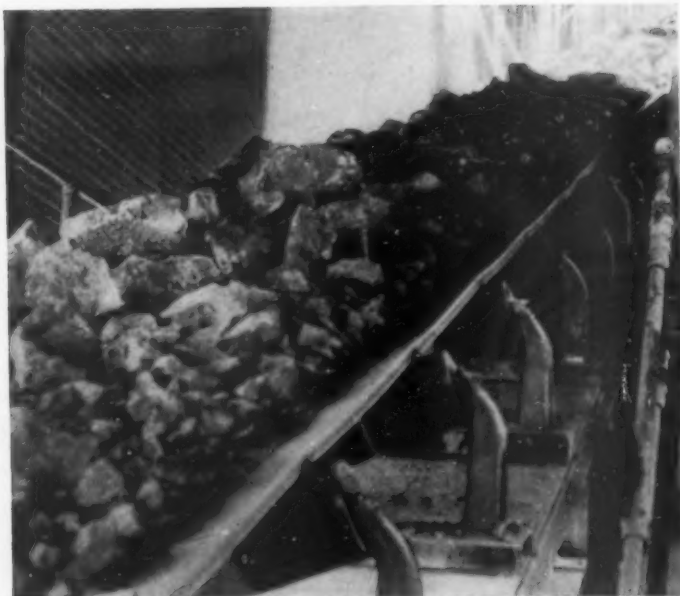
BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY...IF YOU PLAN TO GET ONE, YOU'RE WISE!

AUGUST, 1942

21

TAKE *Extra* CARE of your CONVEYORS



EVERY PART of your materials handling equipment is made of critical materials . . . the metal in the idlers . . . the rubber and duck in the belting . . . even the bearings which enable the equipment to run smoothly and move quickly. So take *extra* care of your Conveyors.

See that all the idlers are in good operating condition . . . that they are lubricated properly and adequately. When lubricating Robins Idlers (which can be done from either side, due to patented design) it is easy to tell when enough grease has been added; it begins to escape through the far-side fitting.

See that the belt runs true; a crooked-running belt may cause not only spillage but also excessive wear. If your belting has a tendency towards side-sway, Robins Training Idlers will keep it straight in both carrying and return strands.

Where very heavy and lumpy material is handled, the excessive belt wear or actual damage imposed at loading points can be greatly reduced by installing Robins Rubberdisc Cushion Troughing Idlers . . . giving you longer belt-life.

Examine your conveyors critically. See whether you are doing justice to them, to yourself and to the conservation program by assuring that they are in condition to render maximum service in these times when maximum production is so vital.

If you need assistance or advice on the proper care of materials handling equipment, ask Robins engineers. Their knowledge is at your disposal wholly without obligation.

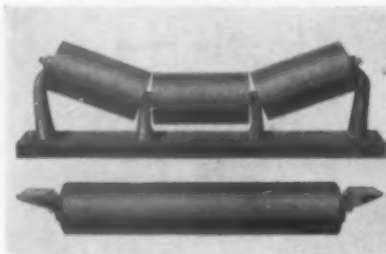
ROBINS

CONVEYING BELT COMPANY

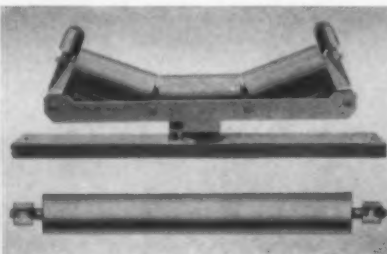
PASSAIC • N. J.

For Material Aid in Materials Handling . . . *It's ROBINS*

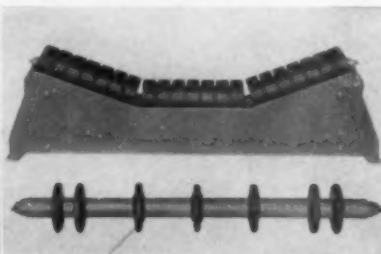
Robins Roller Bearing Troughing Idlers are Timken equipped for smooth running. Made in steel and in one-piece cast-iron.



Robins Training Idlers prevent crooked running belts in both carrying and return strands.



Robins Rubberdisc Cushion Troughing Idlers (Timken equipped) absorb shock at conveyor loading points.



CEMENT AND CONCRETE— WAR CONTRASTS



IN 1917 when the United States went to war with Germany the first time, the portland cement industry was in a bad way. As a construction materials industry it was non-essential; and a non-essential industry could not get power, coal, labor or transportation. There was plenty of construction going on—cantonments by the score—but they provided little or no outlet for cement. Guns and caissons and army supplies were moved by rail or in horse-drawn or mule-drawn vehicles, and paved highways too were non-essential. In a desperate attempt to get recognition of portland cement manufacture as an essential industry, the federal government was induced to design ocean-going ships with reinforced-concrete hulls. It was not until the post-war deflation set in and the concrete highway pavement era began that the portland cement industry became "big business."

Twenty-five years later the United States again finds itself at war with Germany (and Japan, too) with the portland cement industry in quite different circumstances. The fact that this is a war of machines and production as well as of men is clearly evident in the cement and concrete industry as in all others. New shops of all kinds require in the aggregate vast quantities of cement to provide foundations, housing and pavements. Cantonments are no longer rough wood barracks, but contain fireproof sections, curtain walls, concrete foundations, concrete wash rooms and baths, sanitary sewers, sewage disposal works, water works, pavements, etc.

The newest arm of the services, the airplane, alone provides a tremendous demand for cement. Airports and bases require square miles of foundations, pavements, buildings, drainage facilities, etc. Housing or hangars for war planes and shops for maintenance and repair, at exposed bases, require as nearly bomb-proof structures as possible—and this generally means concrete, since reinforced-concrete is the most nearly bomb-proof of any type of surface construction. Access to airports, cantonments, munitions plants and construction of all kinds, in this day of motor trucks, requires pavements, to be built and to be maintained.

However, that does not complete the picture of the part of portland cement in our present-day, war-time economy, because construction for war purposes includes naval dry docks, consuming more cement than the annual production of the whole industry a little more than a generation ago; it includes construction of great dams for hydroelectric power and flood control, and presumably, it includes construction of gun em-

placements and fortifications along coasts and on our island bases. More large quantities of cement go into housing in war-industry areas and into concrete products of every description.

That twenty-five year period between 1917 and 1942 has seen many changes in the portland cement industry and in the product of the industry. First of all it has had a remarkable growth in production and number of plants. It has seen one of the finest jobs of cooperative research and promotion ever accomplished by an American industry. It has had its product studied, investigated, theorized about and specified for by a host of volunteer "experts" as well as by experts employed by the industry. Probably no other engineering structural material has ever received so much volunteer investigation and publicity, both favorable and unfavorable.

Under the typically American urge to change and to find new arguments for use in sales competition, the industry did not long enjoy the commercial advantage of a single standard product. Producers could not resist capitalizing differences that users were quick in discovering. After years of careful preparation for a single standard, specification writers began exercising their wits and their theories to describe properties of cements that appeared desirable to them; some even going so far as to specify how these properties were to be made available.

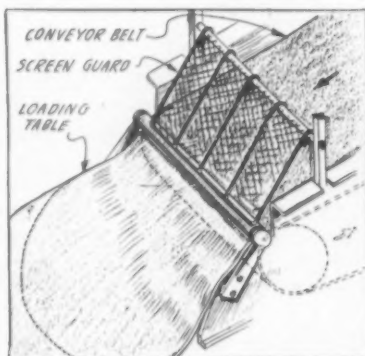
So, the portland cement industry entered the second world war, with a score or more varieties of portland cement—and, largely because of that, apparently—an unknown capacity to meet the expanded war construction requirements of the federal government, which itself has been largely responsible for several varieties of cement. To meet this condition—and to reduce the cement industry's requirements for power and grinding media—the federal government has issued new emergency specifications, which at this writing are just *one more* specification; but it is anticipated that a W.P.B. order will be issued requiring all users of portland cement to accept the new, more coarsely ground product, in lieu of all other varieties. Thus, in twenty-five years the product has been through a complete cycle of changes back to something nearer the earlier product—will finer grinding ever return?

Nathan C. Rockwood

HINTS AND HELPS

Belt Safety Guard for Bag Conveyor

SOUTHWESTERN PORTLAND CEMENT Co., Victorville, Calif., has developed a hinged screen guard to keep the hands of truck loaders away from the



Pivoted screen guard on the end of conveyor belt for handling bagged cement, prevents hands being caught. Dotted line shows where loading table was lengthened

cement bag loading conveyor belt and idler. The sketch shows the guard, the arrow pointing to the location of the dead roller and the conveyor belt. Before the installation of the guard, there was a possibility that the hand of a truck loader might be caught between the dead roller and the conveyor belt while over-reaching for one of the bags of cement.

As an additional precaution, the old loading table was replaced with one which is 8 in. longer and 5 in. wider. This makes it much more difficult to reach the nip point, but the screen guard will protect anyone who accidentally approaches it.

Non-Flushing Feeder for Fine Materials

AN EASTERN portland cement manufacturer has developed the screw conveyor arrangement shown herewith as a solution to the problem of uniformly feeding raw material into its kilns. The regulation of feed into kilns and mills is one of the most difficult of operating problems, since so much depends upon uniformity.

This particular plant has four 7-ft. 6-in. by 122-ft. rotary kilns. On opposite sides of the kiln building at the feed ends of the kilns are two raw material bins. They are not overhead bins but near the floor level. Material is withdrawn continuously from each bin into a variable speed-driven screw conveyor which empties

into an enclosed bucket elevator.

Spanning the building, overhead and above the kilns, are two 12-in. enclosed screw conveyors 71 ft. in length. One elevator feeds into one of these conveyors; the other at the opposite side of the building into the second one. These screw conveyors travel in opposite directions.

Flush up against the bottoms of the conveyors are four 10-in. by 10-



Two main conveyors, each moving in opposite direction; below may be seen the cross screw conveyors (left) going to kiln feed spouts

ft. cross screw conveyors (parallel to the kilns), one for each kiln. In

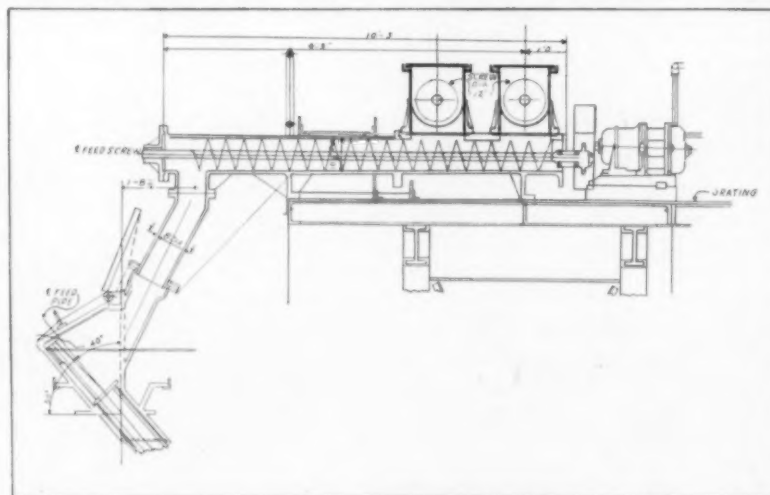
operation, these screw conveyors take material dropped into their barrels through openings in the cross screw conveyors and convey it to the four kiln feed spouts. Their source of material is from the circulating streams of material inside the two cross conveyors.

The theory of operation is that if the feed screws, for some reason, do not fill up from one of the long conveyors, the difference to fill the feed screw barrels will be made up in material from the second cross conveyor. Each feed screw carries the same amount of material each revolution since the screw is uniformly full all the time.

It is necessary that the main cross conveyors carry more than the continuous requirement of the four kilns. Excesses carry over to the feed material bin on the opposite side of the building from where it was withdrawn. There is no head of material to cause flooding and arching, which are common faults when kilns are fed from overhead bins. The same principle of feed is applied, in this plant, to regulate the feed into clinker grinding mills.

Recovering Muddy Top Ledge Stone

HOPKINSVILLE STONE Co., Hopkinsville, Ky., has an 8-ft. top ledge of stone in the quarry which is broken up and intermixed with clay and heavy mud. Otherwise this ledge, which must be stripped off to make way for bench drilling, is satisfactory. To recover it, this stone is loaded



One of four kiln feed screw conveyors showing its relation to two main conveyors carrying materials in opposite directions (just above feed screws)

into trucks and dumped into a low area which is in need of fill. There the stone is subjected to the weather and the clay drops off under the in-



Clayey stone is dumped on pile where weathering action removes clay

fluence of the sun and rain. Then the stone, which is man-size from the quarry, is loaded into a Dempster-Dumpster and hauled to the primary crusher to be processed through the plant. At the same time the fill is being accomplished by the clay.

Grinding Without Balls

FINISH GRINDING of portland cement clinker may be accomplished without the use of steel, iron or pebble media, according to a friend of Rock Products who knows. The clinker itself can be used as the grinding medium. Of course, this scheme is not efficient and it cuts down the capacity of the mill, but it has been done.

Grinding in the portland cement industry is said to consume (and we mean "consume") upwards of 30,000 tons of iron or steel a year. At the moment chilled cast iron balls or other media is obtainable without difficulty, and the 30,000 tons of pulverized iron is sold as cement; or the cement industry makes something like 200,000 bbl. per annum of pulverized iron as cement.

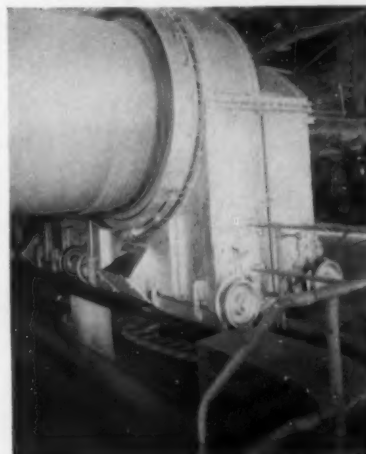
The accompanying flowsheet illustrates how the clinker itself can be used to grind clinker for finished cement, without adding the pulverized iron. The iron is probably harmless and may have unknown virtue in the finished cement, but in any event it is the most costly ingredient.

Clinker By-Pass

IN REBUILDING an Eastern cement mill, having four 7 ft. 6 in. by 122-ft. rotary kilns, a by-pass drag conveyor was installed to handle clinker in the event of a breakdown to any of the four rotary clinker coolers serving the kilns. Normally each kiln discharges clinker to its individual cooler below and a cross drag conveyor handles the clinker from all four kilns to an elevator and into storage.

A fire box door was built into each kiln hood, on the kiln side. If either cooler is shut down, the fire box door on the kiln over the cooler is opened to discharge clinker onto a 12-in. drag conveyor, 55 ft. long. The conveyor is reversible and will carry the

clinker into the cooler serving the adjoining kiln. The temporary doubling of the load in one cooler is the

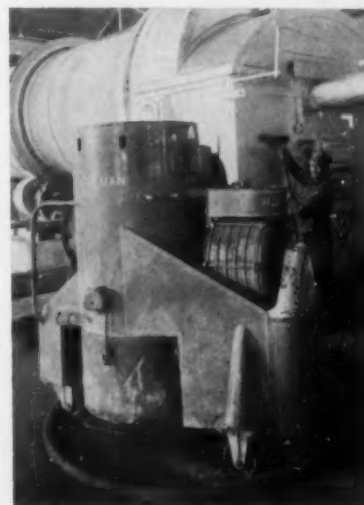


Emergency method of by-passing clinker to cooler of adjacent kiln if one of the coolers may be shut down

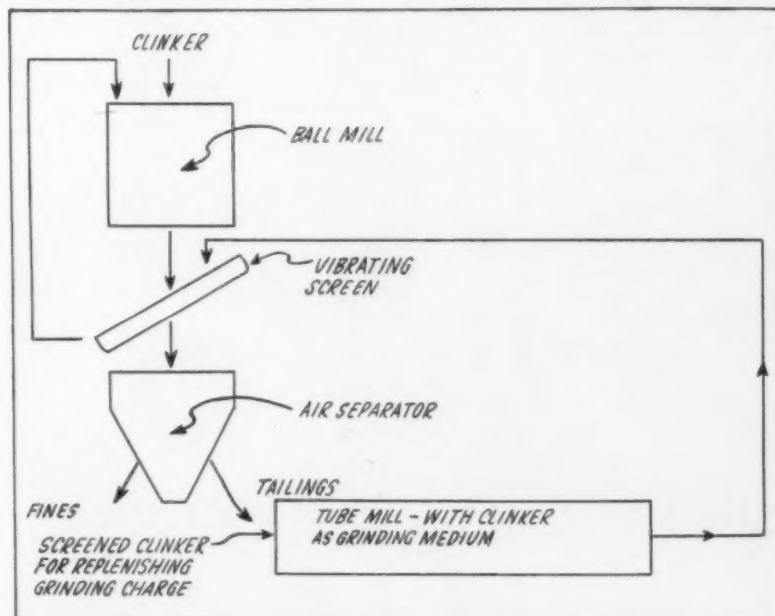
means of preventing kiln shut-downs when any cooler must be repaired.

Portable Dust Collector

SHOWN HEREWITH is one of many applications of a Hoffman "vacuum cleaner" in an Eastern cement mill. The collector has a motor-driven fan, bag filters which discharge dust into the removable container below and sufficient length of hose to permit cleaning up dust in many places even up to the ceiling of the plant. It is used to gather dust from overhead beams, around the kiln hoods, the firing floor and from many places otherwise inaccessible by other means.



Vacuum cleaner used to keep kiln room and other places in the plant free from dust



Flow sheet showing how to finish grind cement with clinker itself as the grinding media

All Crushing By Impact

Produce a cubical product, eliminate flats and elongated pieces, and reduce abrasion losses

CRUSHING LIMESTONE by impact is not new practice, but the plant of the Melvin Stone Co., Melvin, Ohio, holds particular interest since it probably is the first large operation



One of a battery of vibrating scalping screens

to prepare all its stone in that way. Even the fines that go into the manufacture of stone sand are subjected to crushing by impact before classification. In 1941, 250,000 tons of crushed stone were produced after the crushing plant was revamped.

The entire crushing plant was rebuilt principally to make a cubical product, to rid all stone sizes of flats and elongated pieces and to lower abrasion test losses. Ohio state highway specifications allow a maximum loss of 22 percent in stone when tested by the Deval abrasion machine, in 10,000 revolutions at 32 r.p.m. This requirement did not compel the revamping of the plant, but all the stone sizes now easily pass the test, the improvement averaging four to five percent. In the smaller sizes, where more passes are made through the equipment to arrive at the required reduction, losses drop considerably. On a reduction to 1/2-in. minus, abrasion losses run as low as 6 percent.

More important, a 32-ft. top ledge of stone in the quarry and a 12-ft.

By BROR NORDBERG

stratum below the ledge that had been worked are now qualified to meet grade A requirements. This stone would not pass before, or was on the borderline.

Eliminate Flats

The stone quarried is a medium-hard dolomitic limestone that averages 54 percent CaCO_3 and 44 percent MgCO_3 . It is very low in silica. When crushed exclusively through the old gyratory crushers, it had a tendency to fracture into flats and elongations. The percentage of cubed particles was less than 50 percent.

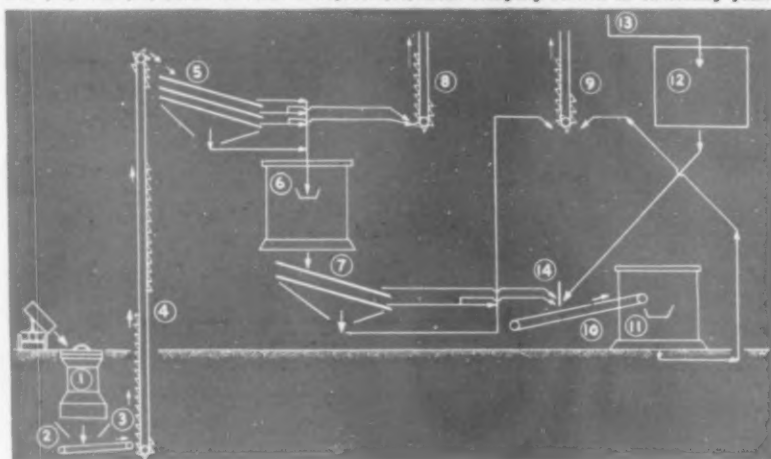
An analysis of the impact crusher product, embracing the size range 0.263 in. to 1.5 in. which includes the normal aggregates sizes, revealed that the number of cubed particles was increased about 30 percent. Actually, a test showed 80.1 percent of

the particles to be definitely cubical, 16.6 percent were intermediate and 3.3 percent were slabs. Slabs were defined as those particles where the longest dimension was five times the narrowest; intermediate, those where this ratio was 3:1.

Production of fines has been increased to about 30 percent with impact crushing (formerly 22 to 27 percent) but that feature is not a disadvantage. The company is a big producer of agricultural limestone and also produces a graded stone sand which absorbs the fines. A better sand is being put on the market, with much less non-cubical particles. Critical engineers have always pointed to non-cubical material as responsible for the harsh workability of some manufactured sands. Compressive strengths of concrete made from this crushed stone are higher than formerly.

Comprising two main divisions, all the crushing is done in one half of the

Flow diagram for plant designed to produce cubical stone. McCully 30-in. crusher (1) discharges into 15-ton surge bin (2) and apron feeder (3) transfers the stone into Webster bucket elevator (4). No. 5 is 4- x 8-ft. triple-deck Allis-Chalmers vibrating screen. Stedman 42-in. Impact-type Single-Cage Disintegrator (6) discharges onto 4- x 8-ft. 2-deck Allis-Chalmers screen (7). No. (8) Webster elevator carries certain sizes of large stone up to screening plant and No. (9) Webster elevator does the same for the product of screen (7) and Stedman 42-in. crusher (11) which is fed by apron feeder (10). Baffle (14) controls the amount of returns from return bin (12) on to (10) to hold the total load to 100 t.p.h. into (11). Bin (12) holds 80 tons of rejects (13) from scalping screen in screening plant



CRUSHING

plant and the products from it are elevated to the screening plant which is superimposed over the bins. There the stone is washed and graded. To make cubical stone, the finish screening plant was left intact. The changes were confined to the crushing half, where three gyratory crushers were displaced by two 42-in. Stedman impact-type reduction crushers.

Overall, the plant is designed to produce finished products, which are dropped into the bins, for direct loading or transfer into stockpiles. No blending is needed to fill any specifications.

Side-dump trucks bring the stone from the quarry to the crushing plant. They dump the stone into a 30-in. McCully gyratory crusher. This crusher was retained from the other plant and is set to discharge a top size of 6 in. A 72-ft. bucket elevator, fed from a 15-ton surge hopper by an apron feeder, puts the stone over a three-deck scalping screen.



Dumping stone into primary crusher, using unusual arrangement for dumping

There are 12 vibrating screens in the plant, all 4- x 8-ft. Allis-Chalmers make.

The scalper sets over one of the impact type reduction crushers, two reduction crushers, and has 4-in.

sq. openings on the top deck. Plus 4-in. stone is run down a chute into this crusher. Thus, a feed of up to 6 in. is put into the crusher. A reduction crusher ahead of it would be a more recommended practice.

Screen openings on the middle and lower decks are always set to produce 4- to 2½-in. and 2½- to 1½-in. stone, to be taken off direct for elevation to the screening plant. However, the trend is decidedly in the direction of more small sizes and it is therefore more usual for either or both of these sizes to join the plus 4-in. into the reduction crusher feed. Minus 1½-in. with all the fines goes into the impact crusher to condition particles that were made slabby in the primary crusher. Nearly 50 percent of the gyratory crusher product is minus 1-in. stone.

Discharge from the reduction crusher flows over a two-deck screen which carries ¾-in. screen openings on the bottom deck and, usually, 1½-in. on the top. Minus ¾-in. is taken off at the screen into a 72-in. bucket elevator to the screening plant, to comprise part of the production of Ohio 46 stone which is ¾-in. to No. 4. A plus ¾-in. size could be taken off in the same way, but, in the production of 46 stone, everything plus ¾-in. finds its way into a second 42-in. impact type reduction crusher. Discharge from this machine is also elevated to the screening plant, where scalping screens make a separation. A belt conveyor carries any returns, requiring further crushing, into an 80-ton surge bin to be fed back into the No. 2 reduction crusher.

Successful operation of the crushers in this plant depends on several factors. The first unit carries a heavy

(Continued on page 29)



Showing application of the two impact type crushers. Above: Apron feeder to second impact mill carries some fresh feed and some circulating load equal to 100 tons per hour. Below: Feed to this crusher is from overhead scalping screen. This crusher is on top of the plant and receives heavy load of oversize and fines from screen

Transportable Plant Solves Problem

Battle Creek Gravel Co. uses two portable crushing and screening units at new location to supplement permanent plant and shorten hauling distance

HEAVY DEMANDS placed upon the permanent plant of Battle Creek Gravel Co., Battle Creek, Mich., west of the city, by defense construction and the need for a plant north of the city to cut down hauling distance resulted in the construction of the semi-portable North Plant.

It was decided to erect a plant which could be moved to a new location if construction demands required a shorter hauling distance or the deposit ran out.

There are several interesting features about this plant. A long Pioneer portable, 24-in. Goodrich belt con-

By RALPH S. TORGERSON

veyor, 300-ft. centers, with a receiving field hopper at the end moves all the material to a short conveyor leading to the portable plants. A 1-cu. yd. Northwest dragline mounted on crawler treads dumps material to the hopper.

Both portable screening and crushing plants are Diamond Iron Works units, the older being a No. 9-36, and the new unit is a 10-36. These plants each have a capacity of about 1000 cu. yd. in a 10-hr. day.

The new unit is the dry plant, making a Michigan state highway 26-A specification material which is a minus ½-in. crushed topping for

asphalt paving. It also produces many of the state highway specification materials. Trucks are loaded direct by means of a Haiss loader or a portable conveyor.

Wet process side of the plant is furnished material by the older Diamond crushing and screening unit by means of an inclined belt conveyor, 150-ft. centers, which carries it to a Pioneer scrubber mounted above a four-compartment 25 cu. yd. Butler steel bin. Below the scrubber is a Pioneer sand drag and to one side is a wooden sand settling tank which receives the sand from the sand drag. Excess water is carried away in the long pipe flume which may be seen in one of the illustrations. The two steel tanks either end mounted on



Left: Field conveyor, 300-ft. centers, with receiving hopper at the end moves material to short conveyor leading to portable plants

Below: Wet screening plant over a four-compartment, 25-cu. yd. capacity steel bin. Equipment includes a scrubber, sand drag, wooden settling tanks, and pipe flume for excess water. This view was taken before the erection of steel bins at each end to hold oversize





Two portable screening and crushing plants with washing plant in the background and delivery trucks to the left. One portable, to the left, furnishes material to the wet plant, and the other supplies dry-processed gravel

A Le Roi gasoline engine drives the long field conveyor and International Harvester engines drive the Diamond portable crushing and screening units and the washing plant equipment.

There are three $2\frac{1}{2}$ -cu. yd. capacity International Harvester trucks for deliveries of sand and gravel, and for any plant haulage that may be necessary.

John Postma is manager of the Battle Creek Gravel Co., and the superintendent of the North or No. 2 plant is G. DeWindt.

Crushing by Impact

(Continued from page 27)

load, 150 to 175 tons per hour, that represents most of the plant capacity. Its capacity depends upon speed of rotation of the internal cage, which is 840 r.p.m. None of the returns come back to this machine. The second crusher turns at 810 r.p.m. and carries a uniform load of 100 tons per hour to balance the plant power load. The plant is operated with a Diesel power unit.

Rate of rotation of this crusher is held down to prevent making excessive fines, and the circulating load is of importance in governing the qualities of the product and output. The more passages through the crusher,

the better the particle shape and the results of abrasion tests. The bigger stone, which has passage through the first reduction crusher is not so much in need of shape development as the smaller sizes, since it does not fracture into slabs through the primary breaker. If the crushing is down to $\frac{1}{2}$ in., the circulating load on the second crusher is 50 percent, if $\frac{3}{4}$ -in., it is 25 percent.

The feeder arrangement into this crusher is of original design and devised to hold the rate of intake at 100 tons per hour. Stone to be fed into the crusher, direct from the 2-deck screen over it, is chuted on to an inclined endless apron feeder. Between the point of discharge of this chute at the feeder and a converging chute from the surge bin holding the returns, is a vertical baffle. Its location is such that all the flow-off from the screen will be carried on the feeder into the crusher. The amount of the returns from the other chute that will reach the apron feeder is determined by the baffle, which will strike off the total material at a pre-determined bed thickness. Speed of the feeder is such that, at this constant load level, 100 t.p.h. will reach the crusher.

Gravity operation is followed in the crushing plant. Capacity of the plant

runs about 200 t.p.h. Each reduction crusher is driven from a 100-hp. electric motor by V-belt. Actually, the power consumed is considerably less, although no accurate determinations have been made yet. All the wearing parts, which comprise the cages, pins and breaker plates, are of manganese steel. Maintenance costs are unusually low, averaging less than $\frac{3}{4}$ c per ton of production, since the machines were started up in June, 1941. It will be remembered that the stone is semi-hard and contains almost no silica. As plant capacity is a little greater than it used to be, this factor more than offsets a slight increase in power consumed. Melvin Stone Co. was formerly known as C. C. Beam, Inc., and is headed by C. C. Beam, a member of the board of directors of the National Crushed Stone Association.

Distribution Plant for Bulk Cement

HALIBURTON BULK CEMENT CO., Ada, Okla., has built a bulk cement plant of 3000 sack capacity for the purpose of distribution over the state. Cement is shipped to the plant by rail for storage and re-loading into semi-trailer trucks. Vern Thompson is in charge of the plant.



Elected Vice-President

WILLIAM M. BLACK, prominent for many years in the activities of the Manufacturers' Division of the Na-



William M. Black

tional Crushed Stone Association and the National Sand and Gravel Association, has been made a vice-president of the American Brake Shoe and Foundry Co., Chicago Heights, Ill. Mr. Black has been president of the American Manganese Steel Division since 1940 and will continue in that capacity. He joined this division in 1912 and became its general sales manager in 1934 and vice-president in 1935.

Heads Highway Lab

PROF. D. V. TERRELL, head of the civil engineering department of the University of Kentucky, was recently made assistant dean of the College of Engineering. A new highway laboratory has been set up at the University for testing materials and will be under the supervision of Professor Terrell.

Retires

J. STANLEY DOWNS, superintendent of the Stockertown, Penn., plant of the Hercules Cement Corp., Hercules,

Penn., has retired due to ill health after 19 years of service. His place is being taken by Warren L. Breinig, who for many years has been assistant superintendent in charge of the plant.

Changes Position

HARRY A. STELLEY, former superintendent of the Buffalo Gravel Co., Buffalo, N. Y., is now with Basic Magnesium Inc., in Nevada, on the construction of the new magnesium plant. Basic Refractories, Inc., Cleveland, Ohio, is the parent company.

Becomes Peerless President

W. C. RUSSELL, formerly vice-president and general manager of the Peerless Cement Corp., Detroit, Mich., has been made president of the company; R. D. Baker is chairman; W. B. Russell, formerly assistant secretary, is now vice-president and assistant secretary; W. L. Kaiser, formerly works manager, has been named vice-president in charge of operations; L. F. Lawler, vice-president in charge of sales; M. M. Sepic holds the position of secretary-treasurer; Miss M. E. Mills remains assistant treasurer. W. C. Russell and B. D. Eblen have been elected directors.



W. M. Camp, left, and L. K. Camp, right, are an enterprising father and son combination operating Camp Concrete Products Co., Columbus, Ga., large manufacturers of concrete pipe

Heads Research

RICHARD G. UHLIG, until recently vice-president of the Missouri Portland Cement Co., has become associated with the Fuller Co., Catasauqua, Penn., as manager of the Research Department.

Elected President

ALFRED W. KIMMEL, owner and operator of the Ready Mixed Corporation, Dayton, Ohio, has been elected president of the Ohio Ready Mixed Concrete Association.

Honored

FRED T. WHITING, manager of the Westinghouse Electric and Manufacturing Company's northwestern district, was awarded his company's highest honor—the Westinghouse Order of Merit for distinguished service. In making the presentation voted by the company's board of directors, B. W. Clar, vice-president in charge of sales, paid tribute to Mr. Whiting for "strengthening the commercial relations of Westinghouse with customers in the Northwestern District, and for his leadership in community activities which have enhanced the prestige of the company." Mr. Whiting received a bronze medal bearing his name and a silver "W." Since its inception in 1935, the Westinghouse Order of Merit has been presented to some 250 employees for outstanding contributions to the electrical and mechanical arts and to their company's progress.

New P.C.A. District Manager

R. W. WINTERS, for the past seven years district engineer in charge of the Oklahoma City office of the Portland Cement Association, has been appointed district manager of the Association with headquarters in Kansas City, Mo. He will have charge of the Association's work in Kansas, Oklahoma and western Missouri. Mr. Winters is a graduate of the School of Mines, University of Pittsburgh. He joined the staff of the Association eight years ago.

Also Heads Potash Division

JAMES P. MARGESON, formerly in charge of magnesium development for International Minerals and Chemical Corp., Chicago, Ill., has been elected vice-president in charge of both magnesium and potash mining. Franklin Farley, general manager in charge of the phosphate division, has been named vice-president in charge of this operation.

ROCK PRODUCTS

With WPB

RAYMOND B. LADOO is now chief of the mica and graphite branch of the Materials Division of the War Production Board. His appointment took effect April 29, 1942. Howard F. Wierum is to be the technical consultant and senior commodity specialist.

Director Military Engineers

A. W. HERRINGTON, president of the Society of Automotive Engineers, technical advisor to Col. Louis A. Johnson on the recent American Economic Mission to India, and president of The Marmon-Herrington Co., Indianapolis, Ind., has been elected to serve for three years as a director of the American Society of Military Engineers.

Heads Minerals Division

BENJAMIN LEROY MILLER, professor of geology at Lehigh since 1907, has been elected Chairman of the Industrial Minerals Division of the American Institute of Mining and Metallurgical Engineers. Prof. Miller is well known to Rock Products' readers, particularly in the cement and lime industries, and his students are on every continent. He has encircled the earth twice, once in 1927, and the other way around in 1937 to regain the day he lost on the first trip. An early trip was to Great Britain and Ireland, another to central Europe, a third to Spain for the International Geological Congress, a fourth to Scandinavia. His trip to the Southern Hemisphere is recorded in "Mineral Deposits of South America." In 1940



Benjamin Miller

he was booked for Australia but because of the war went instead to Alaska. He spent the summer of 1941 in Central America. Thus he has gained a broad world knowledge of mineral deposits, both metallic and nonmetallic.

Regional FWA Manager

ROBERT L. MACDOUGALL, former assistant commissioner of Works Progress in Washington, has assumed charge of the Federal Works Agency and its constituent administrations in the southeastern region consisting of Alabama, Florida, Georgia, Mississippi, South Carolina, and Tennessee. He is the first official to hold that position.

Go to Army

T. D. SHIELDS, field engineer for the Portland Cement Association with headquarters in Abilene, Texas, has been notified of his appointment as captain in the Army air forces. Mr. Shields had been stationed in Abilene since 1925. He is a graduate civil engineer from Virginia Military Institute.

CHRIS J. SHERLOCK, president, American Road Builders' Association, Montgomery, Ala., has been commissioned a major in the Corps of Engineers, U. S. Army. He is assigned as operations officer for the Denver, Colo., district of the corps.

Returns From Down Under

JOHN L. SAVAGE, chief designing engineer for the Bureau of Reclamation, has returned from a trip by plane to Australia, where he served several months as consultant on dam construction. He was to have served the East Indian Government in a similar capacity but was prevented by the outbreak of war in that region. Mr. Savage has helped considerably with the Reclamation Service cement specifications.

In Chemical Industry

JOHN M. LUPTON, formerly advertising manager, Robins Conveying Belt Co., Passaic, N. J., has joined the staff of Acheson Colloids Corp., Port Huron, Mich., as advertising manager.

Elected Director C.M.A.

JOHN S. BAILEY, Concrete Manufacturing Co., Atlanta, Ga., was a graduate of Cornell University in 1914, where he majored in concrete engineering. Immediately upon graduation,



John S. Bailey

he became identified with the Portland Cement Association in Alabama and Georgia and he remained with the P. C. A. until 1926 except for overseas duty in World War I. In 1926, he began the manufacture of stone tile in Atlanta and now specializes in lightweight concrete masonry units. Mr. Bailey was elected a director of the National Concrete Masonry Association at the N.C.M.A. national convention in Buffalo and was in charge of arrangements at the following regional meeting held in Atlanta.

Technical Director

JAMES J. HARRISON of Baltimore, Md., is now technical director and chemical engineer at the calcite plant, Towson, Md., of Harry T. Campbell Sons Co.

Labor Office in OPA

ROBERT BROOKS, formerly with WPA, is the recently appointed director of the Labor Office in the Office of Price Administration. Mr. Brooks will act as liaison officer between OPA and the Labor Production Division of the WPB, the War Manpower Commission, and other Federal agencies.

Industrial Hygienist

FRANCIS R. HOLDEN, PH.D., a specialist in healthful working conditions, has been appointed industrial hygienist on the staff of Industrial Hygiene Foundation at Mellon Institute, Pittsburgh, Penn. He will assist companies associated with the Foundation in controlling employee health hazards which are increasing with peak war production.

Chief Nonmetal Division

DR. OLIVER BOWLES, geologist, mining engineer and internationally-known authority on nonmetallic minerals, has been named chief of the Nonmetal Economics Division of the Bureau of Mines, according to an announcement by Dr. R. R. Sayers, Director. Dr. Bowles, who formerly was assistant chief of the Nonmetal Economics Division, has been with the Bureau since 1914. He is the author of more than 100 Bureau of Mines publications. After joining the Bureau, Dr. Bowles was a quarry technologist and was assigned to study problems and production methods of the stone industries. He later was appointed a mineral technologist in the Washington office of the Bureau. From 1923 until 1928 he was supervising engineer of the Nonmetallic Minerals Experiment Station at New Brunswick, N. J. As chief of the Nonmetal Economics Division, Dr. Bowles fills a vacancy created by the resignation of Paul M. Tyler, who left the Bureau to join the Board of Economic Warfare.

War Transport

E. C. SMITH, Jr., general manager of the West Virginia Sand and Gravel Co., Charleston, W. Va., has been named local administrator for conservation of war transportation.

Goes to Wolverine

ROGER C. GLEASON has been elected vice-president of the Wolverine Portland Cement Co., Coldwater, Mich. He was formerly vice-president and treasurer of Wallfill Co., Chicago, Ill.

On W.P.B. Committee

H. E. CHISM, general manager of the Texas Cement Plaster Co., Oklahoma City, Okla., has been named on a gypsum industry advisory committee for the War Production Board.

Technical Manager

R. W. MILLER, who has been connected with the Pittsburgh Plate Glass Co. for 12 years, has been appointed manager of the technical service department of the company's Columbia Chemical Division, succeeding Dr. G. L. Cunningham who has resigned. Mr. Miller joined the company in 1930 after receiving a B.S. degree in chemistry at Pennsylvania State College. After three years in the research department on pilot plant

operations and general investigation, he was assigned to study on the uses of calcium chloride in soils for engineering purposes.

Research Engineer

JUD GUSTIN, formerly research chemist with the Coplay Cement Manufacturing Co., has become research engineer with the Atlas Lumite Cement Co., Buffington, Ind.

P.C.A. Engineer

S. J. TWYMAN has accepted a position as field engineer for the Portland Cement Association in Champaign, Ill.

New President of Stone Company

W. J. LYNCH, president and director of W. J. Lynch Co., building construction, Chicago, has been elected president of Dolese and Shepard Co., Chicago, Ill. Mr. Lynch's



W. J. Lynch

original employment in the building industry was with William Grace Co. Subsequently he was vice-president of Thompson-Starrett Co., in charge of business in the Central West, and has been president and director of his own company for the past 16 years. He is a director of the Republic Realty Mortgage Corp.; chairman of the Reorganization Committee, Chicago Rapid Transit Co.; and recently resigned as a director of Consumers Co. Mr. Lynch is a member of the Chicago Plan Commission and served for two years as a member of the Chicago Housing Authority. He is also a member of the Western Society of Engineers.

Drilling for Brucite

R. L. SMITH, engineer for the Standard Slag Co., Youngstown, Ohio, has been directing preparations for extensive core drilling on large deposits of brucite owned by his company in the Mammoth or Gabbs Valley district in northwestern Nye County, Nev.

On War Construction

JOHN FURMAN TRIBBLE, research engineer and acting materials engineer, left the Alabama highway department July 1 to become chief construction engineer for the firm of Goodwin & Van Keuren, on construction of a flying school in Alabama.

Diamond Promotion

GEORGE S. COOPER has been elected executive vice-president of the Diamond Alkali Co., Pittsburgh, Penn. For the past five years Mr. Cooper has been vice-president in charge of sales.

Elected Director

WILLIAM L. KEADY, president of U. S. Gypsum Co., Chicago, Ill., has been elected a director of Montgomery Ward & Co., Inc.

S. LIVINGSTON MATHER of Cleveland has been named to the board of directors of the Bessemer Limestone and Cement Co., Youngstown, Ohio, to replace Laury S. Stewart of Youngstown.

Expedites War Orders

DEAN BOYCE F. MARTIN, of the Emory University School of Business Administration, has resigned to accept a position with the Louisville Cement Co., Speed, Ind. Dean Martin will have the special assignment of expediting defense products manufactured by the company and its subsidiaries.

Gypsum to Munitions

CHARLES H. MARQUESS, superintendent of the National Gypsum Co. mines in Sun City, Kansas, has gone to Texas, where he will serve the company in a \$25,000,000 munitions plant it is constructing and soon will begin operating. Succeeding Mr. Marquess as superintendent in Sun City will be Sam Sheplar, who has been his assistant for a number of years.

ROCK PRODUCTS, August Special CEMENT SECTION

Slurry filters are coming back: Medusa
installs units at Silica, Ohio, plant

Lehigh's Alsen, N. Y., plant has interest-
ing grinding and blending practices

Speed up finish grinding at Permanente
using grinding aids

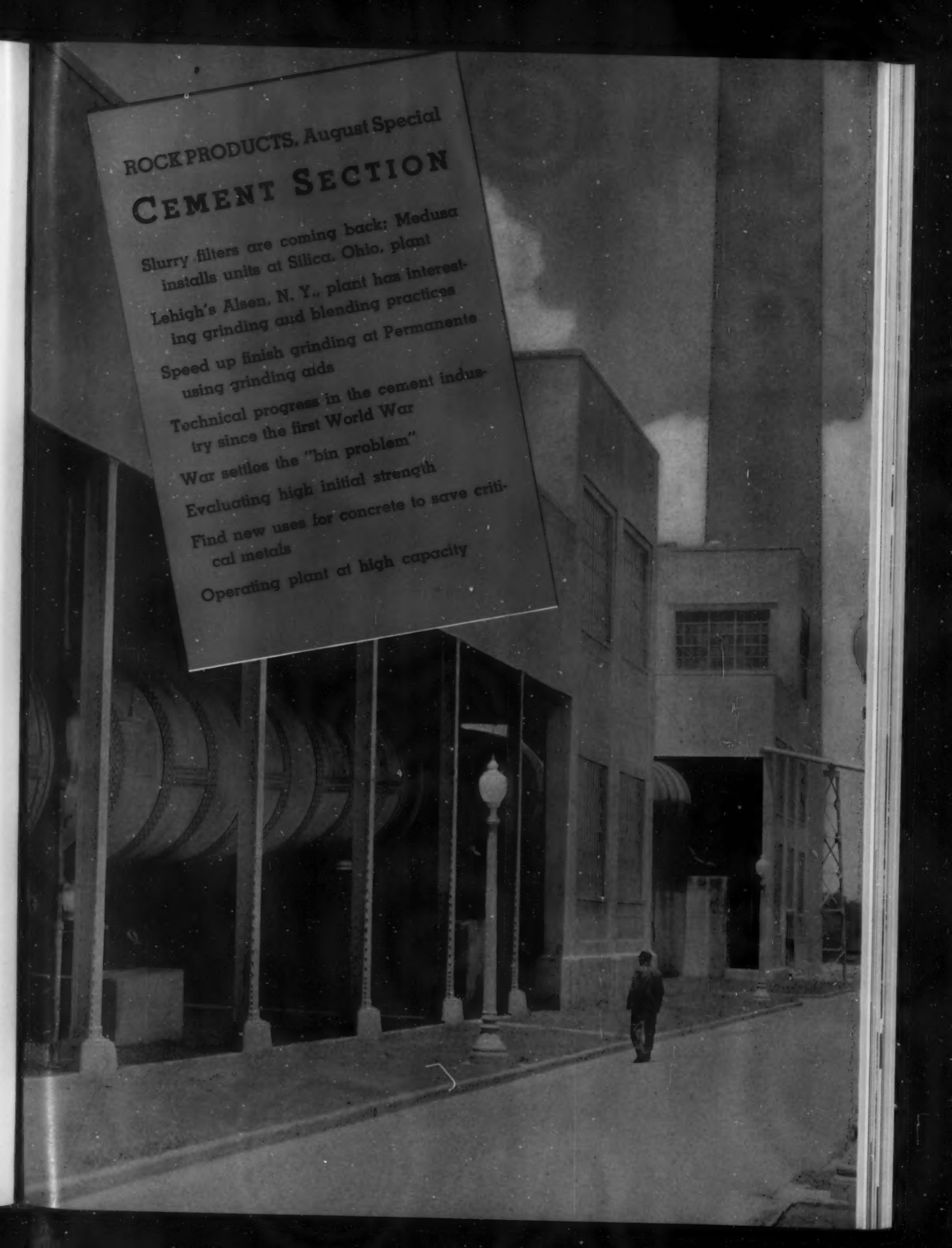
Technical progress in the cement indus-
try since the first World War

War settles the "bin problem"

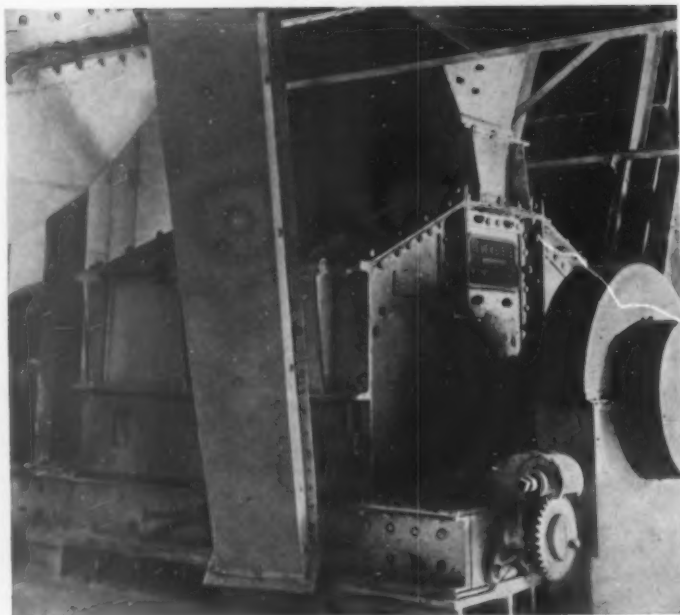
Evaluating high initial strength

Find new uses for concrete to save criti-
cal metals

Operating plant at high capacity



"PENNSYLVANIA"



"PENNSYLVANIA" REVERSIBLE HAMMERMILLS

"Pennsylvania" REVERSIBLE Hammermills, with High Drop, Central Feed, do major crushing by smashing head-on impact between the Hammer Faces and imperforate Anvils,—and finish the sizing over Duplex adjustable cages,—in alternate RIGHT and LEFT HAND operation,—on Cement Making Materials, Limestone, Lime and Gypsum.

This advanced crushing technique affords,—

AUTOMATIC HAMMER TURNING

AUTOMATIC HAMMER AND CAGE BAR RESHARPENING

INCREASED CAPACITY PER FRAME SIZE

FINESS AND UNIFORMITY WHICH INCREASES GRINDING EFFICIENCY

SHARPLY CUT UPKEEP COST AND REDUCED POWER DEMAND

Complete Raw Side Crushing Equipment

Put Your Reduction Problems up to "Pennsylvania" Engineers

Representatives in
Principal Centers

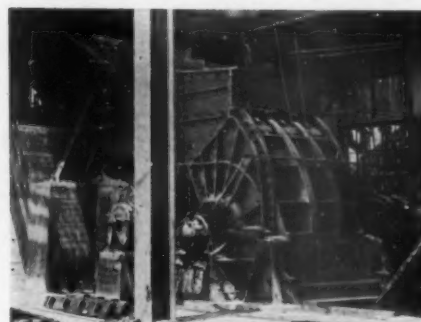


Associated with Fraser &
Chalmers Engr. Wks., London

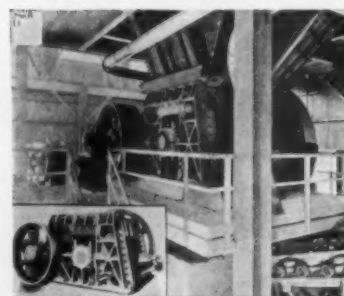
General Offices: Liberty Trust Bldg., Philadelphia



"PENNSYLVANIA" REVERSIBLE IMPACTOR preparing abrasive cement making materials by impact crushing, for grinding mills in modern Western Plant. Other services include impact reduction of Ores, Refractories, fluxing Minerals, Road Chips, Aggregates, Gravel, etc. Patented. Bulletin 6000.



PENN-PRIMARY Hammermills with Dump Hopper and Feeder combine the primary and secondary reductions of Cement-making materials, at minimum building, foundation, rehandling, power and maintenance costs.

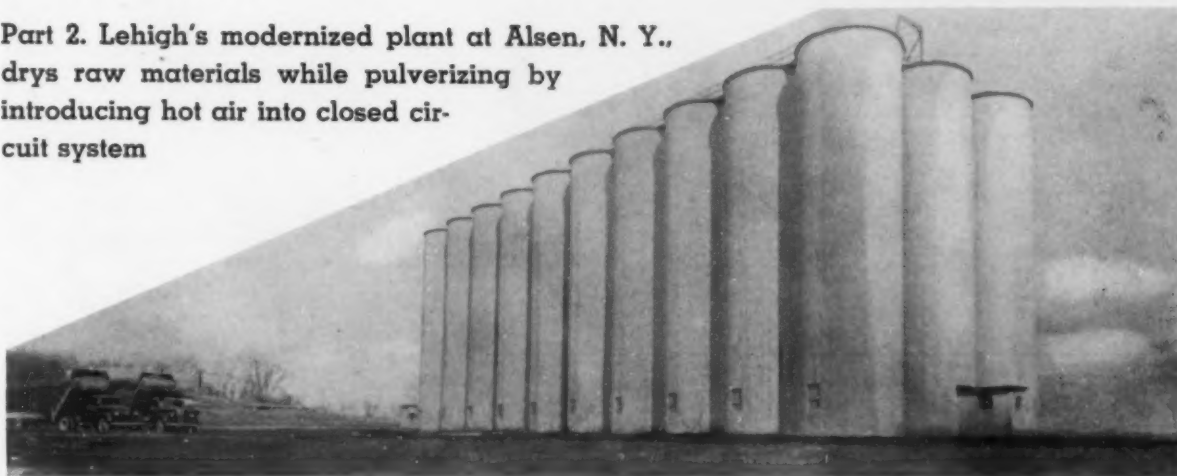


PENN-LEHIGH and PENN-STEEL Series Single Roll Crushers (12 sizes) are specialized for Primary and Secondary reductions of Cement-making Materials, Limestone, Gypsum and Ores,—DRY, DAMP or WET. Patented.

STEELBUILT CRUSHERS

Mills With 1000% Circulating Load

Part 2. Lehigh's modernized plant at Alsen, N. Y., dries raw materials while pulverizing by introducing hot air into closed circuit system



Battery of 30 new silos for cement storage. Foundations rest on bed rock 10 ft. below ground level

AT THE LEHIGH PORTLAND CEMENT Co., Alsen, N. Y., plant, kiln feed materials, consisting of stone that has been roughly blended by the stone crane operator in filling the raw mill feed hoppers, and clay are ground through a single mill in closed circuit with two 16-ft. mechanical air separators. Production of the mill is 40 tons per hour of a product with 90 percent passing a 200-mesh sieve.

Proportioning of the limestone to clay is regulated by separate electromagnetic vibrator and constant weight belt feeders under each feed hopper. These proportioned materials are moved by a 75 t.p.h. drag conveyor into the 48-ft. bucket elevator that feeds into the pulverizer. Variable vibration on the feeders is used to control the proportioning, as set by the plant chemist. The feeders also record the weight of materials handled. Variations in the counter-poise setting are made to change the relative proportions of clay to stone being fed to the mill. Another way of correcting, or changing, the proportions is to re-set the weights on the poise. In changing the amount of total feed into the elevator feeding the grinding mill, the relative proportions hold the same automatically, by means of a relay from the mill motor or elevator drive which cuts down or increases the output of the feeders.

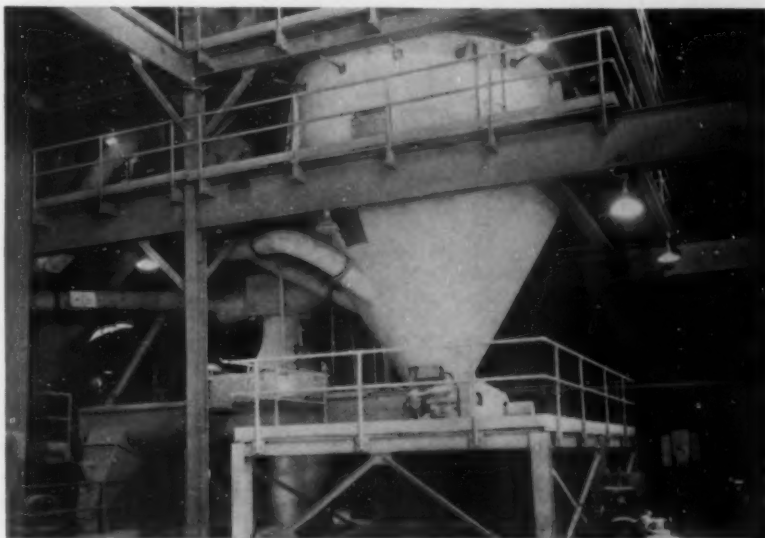
Pulverizing is done in a No. 366

By BROR NORDBERG

B. & W. pulverizer in closed circuit with the two air separators, the mill discharge being elevated by a 48-ft. bucket elevator and conveyed by a screw conveyor into the air separators. Tailings from the separators join the fresh feed stream at the bottom of the elevator feeding the mill. Circu-

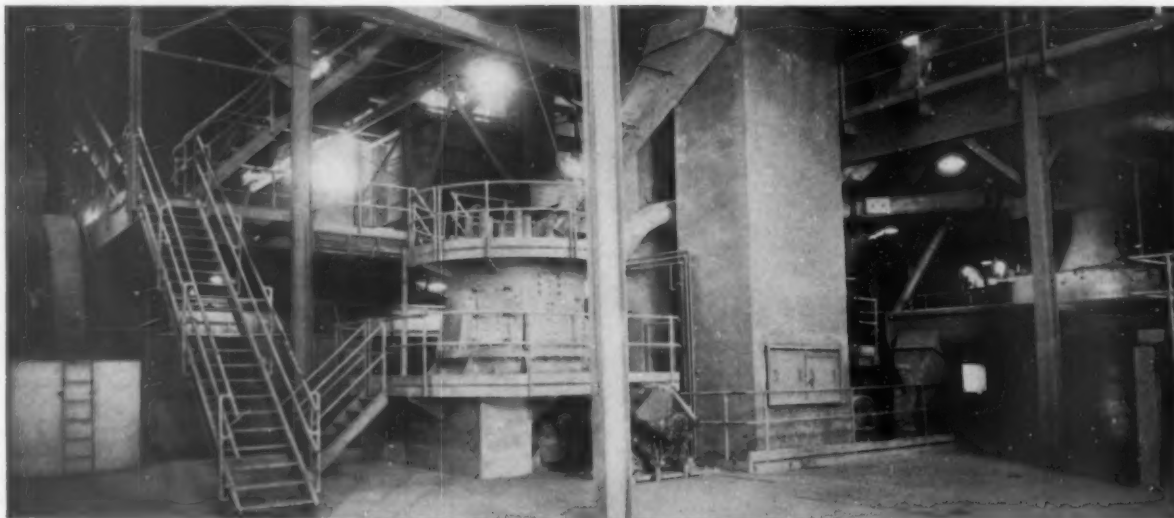
lating loads as high as 1000 percent are carried in the grinding system, which dries the material during the grinding operation.

Bucket elevator casings are constructed with 6 in. of concrete, and the air separators, piping and bag-type dust collector serving the grinding system are covered by asbestos and magnesia insulation. Heated air from an automatic oil-fired hot-air furnace is circulated through the en-



Insulated air separator closed-circuited with raw mill, showing screw conveyor below which moves material to be pumped to blending bins

GRINDING



General view of mill room with raw grinding mill in center, and finish grinding tube mill in left background

tire system, with the bulk through the air separator. The furnace is rated at 5,000,000 B.t.u. per hour. Material discharged is automatically maintained at 165 deg. F. through the circulation of air heated to between 600 and 800 deg. F. A 600-hp., 900 r.p.m. high torque, slip ring motor drives the pulverizer and the drive on the air separator is a 100-hp. gear motor. Dust is returned into the F-K pump hopper with the finished product from the air separator. Mixing paddles inside the barrel of the conveyor distribute the dust so that representative samples are taken at the discharge point of the separator into the 8-in. pump to the blending tanks. Samples are taken of the stream feed-

ing the grinding mill and from the discharge out of the mill. Space is provided in the plant for a future duplicate grinding unit.

Grinding (finish)

Finish grinding is accomplished in the same mill building as the raw grinding, but in two stages. Similar proportioning equipment handles the feed of clinker and gypsum into a Hercules preliminary mill which grinds in open circuit. Proportions are changed only for the different types of cement, when the SO_3 must be varied, by re-setting the scale poises. The mill is direct-driven by a 350-hp. synchronous motor and produces a product 43 percent minus 200-mesh

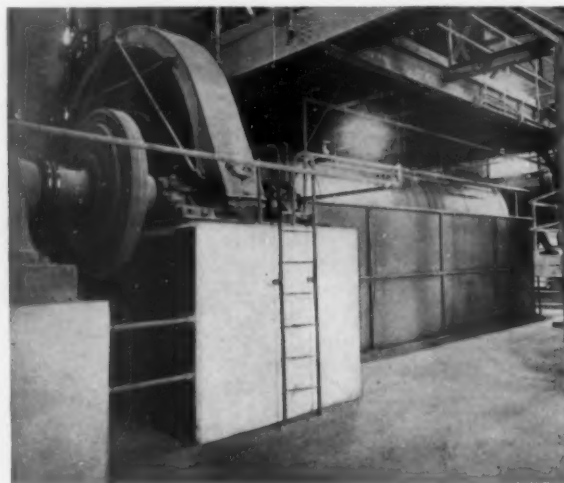
at 200 bbl. per hour, using an 8-mesh discharge screen. With a 12-mesh screen, 170 bbl. per hour is ground at 53 percent through 200-mesh. The preliminary mill product is carried by a screw conveyor to a 53-ft. elevator and into a bin which is the source of feed into two 7- x 26-ft. tube mills.

These mills, each driven by a 500-hp. synchronous motor, operate in closed-circuit with a 16-ft. mechanical air separator in manufacturing all cements except Merriman specification, for the New York Board of Water Supply, which bases its tests on the 200-mesh sieve rather than on surface area. A 2 percent residue on

(Continued on page 40)

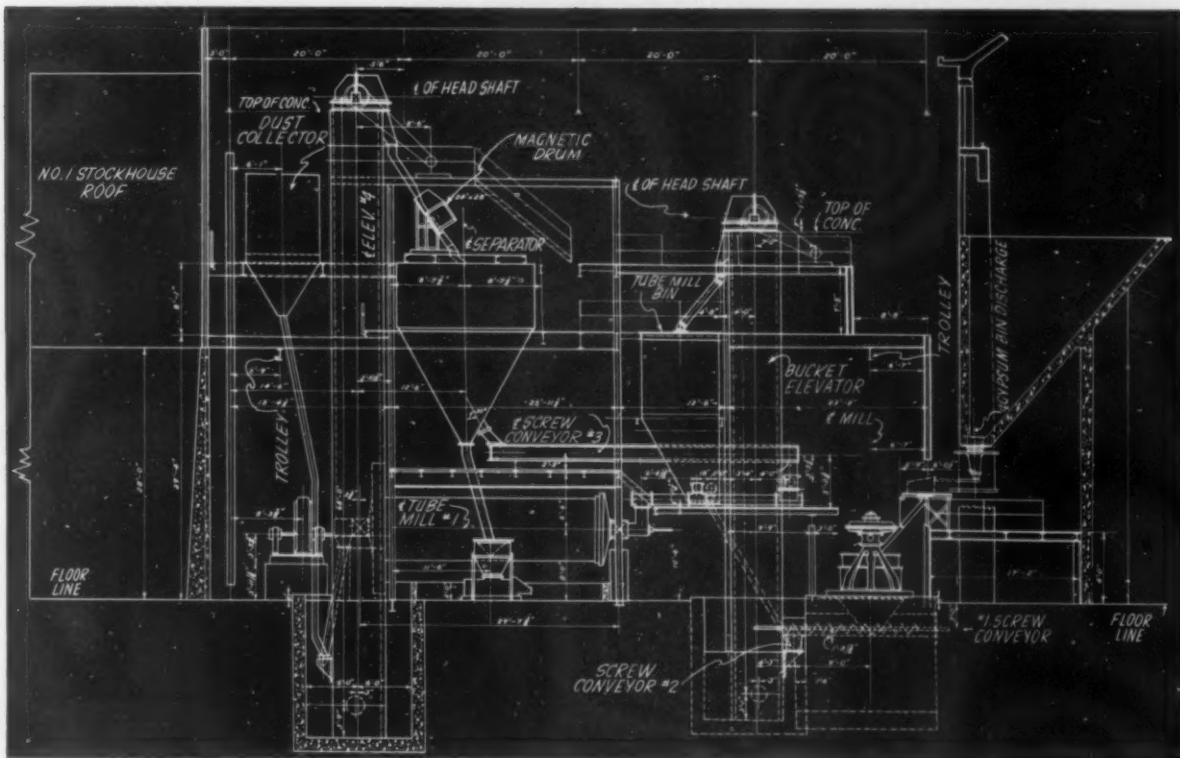


Preliminary clinker grinding mill. Note sampler in right background for autoclave test samples



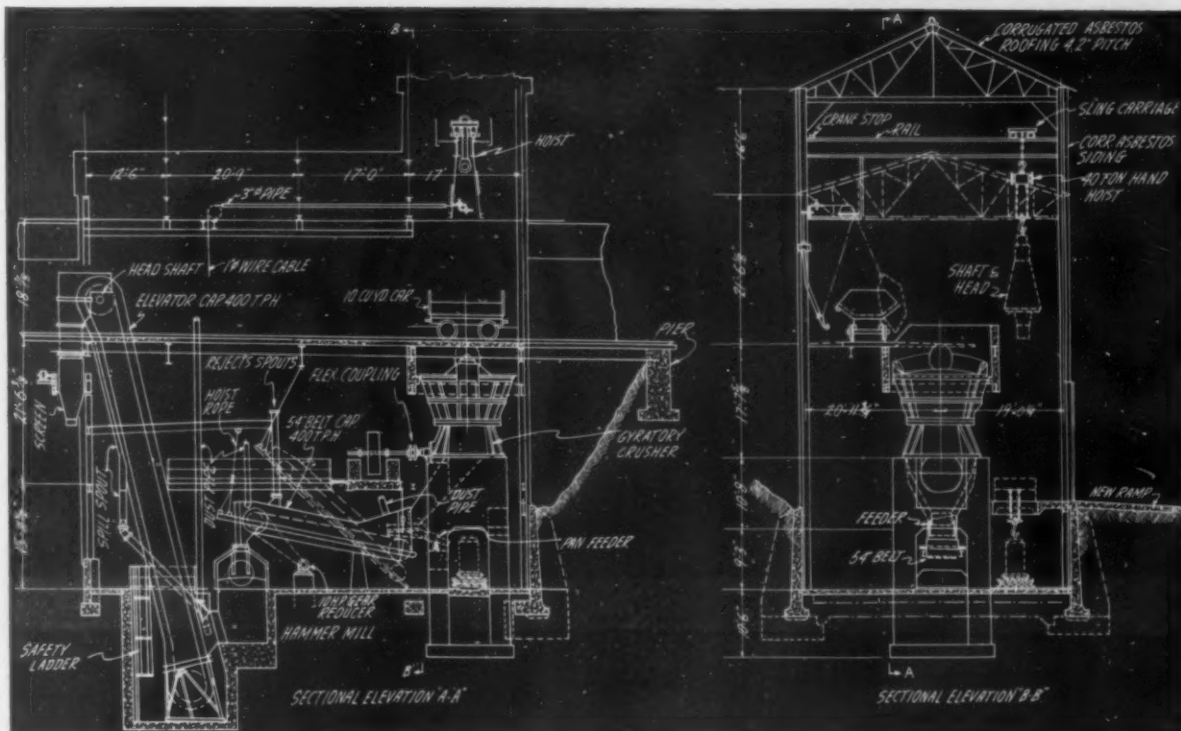
One of two compartment mills opened up like tube mills for finish grinding of cement in closed circuit

GRINDING



Above: Elevation of mill room showing arrangement of clinker grinding mills, screw conveyors, elevators, and dust collector

Below: Details of stone crushing facilities, illustrating method of dumping rock into primary crusher and handling to secondary crusher



Stepping Up Finish Grinding

For "all-out" production, The Permanente Corporation uses grinding aids, grading of ball charges, and a heavy circulating load

ALTHOUGH THE PERMANENTE CORPORATION, headed by Henry J. Kaiser, with plants located at Permanente, Calif., is a comparative newcomer to the cement field, their production of the Santa Clara brand of standard portland cement is an outstanding example of the strides made in the cement industry on large scale production and chemical composition.

It is interesting to note that this cement is definitely in line with the new trend in cement manufacture, having a chemical composition of high combined silicates, low C_3A , low alkali, low free lime, and having practically no contraction or expansion on the autoclave test. The cement is ground to a fineness of 98 percent passing the 200-mesh sieve with a surface area value of 1850 to 1900 sq. cm. per gram as determined by the Wag-

By A. J. ANDERSON*
and J. W. SHARP†

ner turbidimeter, and the tensile and compressive strengths obtained from this cement are very high and surpass the present specifications by a considerable margin.

Permanente has available raw materials to produce any type of portland cement except white cement, and this plant alone will produce more than 5,000,000 bbl. of all types of cement during the present fiscal year. This heavy production schedule demands that all equipment be operated at the highest possible efficiency, and due to the high combined silicates and the very hard burn given to the clinker, the finish grinding of the cement has presented a real problem.

Step Up Finish Grinding

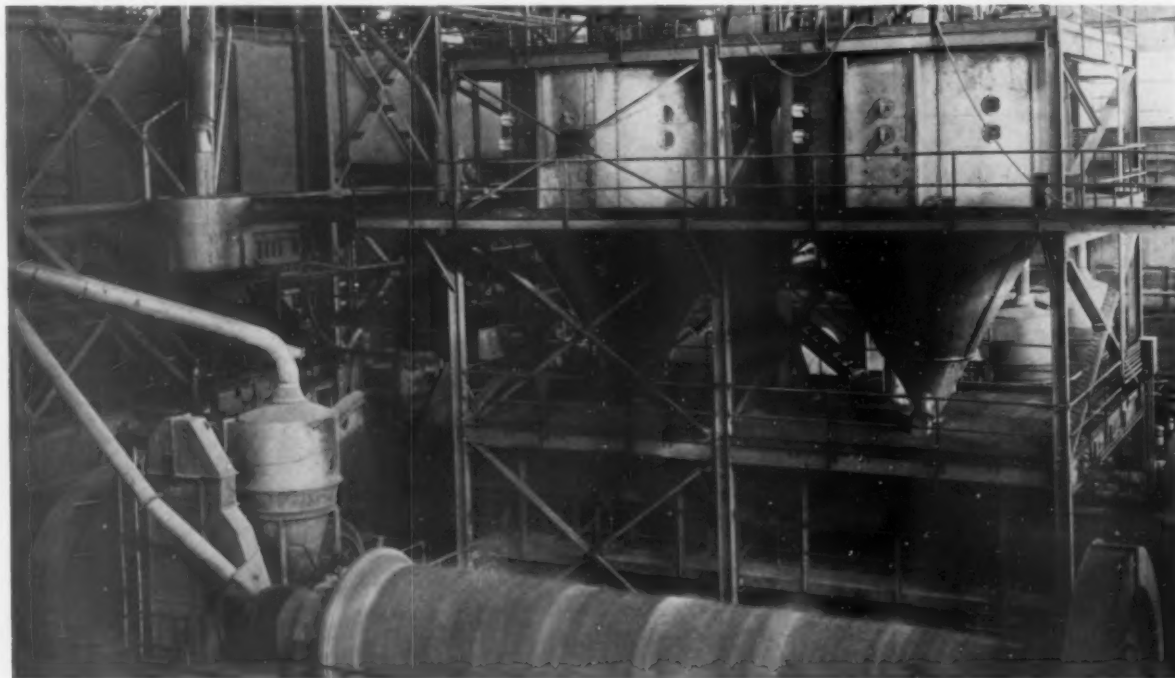
At the start of operations a very complete and thorough study was

made of the finish grinding problems in order to determine the most efficient ball grading to give a maximum production together with the desired micron size distribution in the finished cement. It is surprising that three types of grinding media, namely, forged steel balls, concave balls, and cylpebs are used in the various mills and all are giving excellent service.

Increase Capacity 30%

The Permanente organization has been able to increase the finish grinding capacity of the plant by more than 30 percent. This has been made possible by the use of T.D.A., grading of ball charges, and the practice of carrying a 350-400 percent circulating load in the finish grinding circuits. Permanente operates five finish cement mills. There are three double ball mills having 9½- x 10-ft. prelinimator ball mills ahead of 8- x 40-ft. cement

*Plant superintendent, The Permanente Corporation.
†Chief chemist.



Looking toward finish grinding section of millroom showing two separators located over one type of mill to save room

AGAIN—JEFFREY EQUIPPED MEANS TOPS IN PRODUCTION ... IN EFFICIENCY



General view (above) of this up-to-date plant shows the kilns and the stone crushing and screening plant. At the left is a Jeffrey bucket elevator for handling coal from car to storage bins.

Jeffrey conveyors, crushers, elevators, feeders and portables . . . rugged and efficient units in continuous operation at this most modern plant where high productivity for war needs is essential.



View above shows the Jeffrey inclined bucket elevator for handling kiln stone from crushing plant to storage bins. At the lower left a Jeffrey steel apron conveyor handles flux stone from screens to railroad cars.



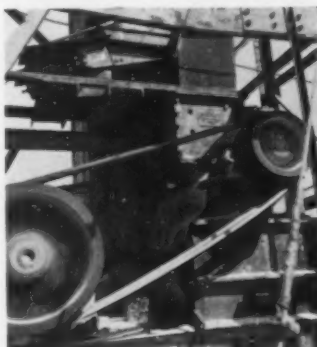
Jeffrey combination pan conveyor and picking table. This unit handles the burned lime from kilns to lime screening and crushing plant.



ONE-MAN OPERATION 600 Tons per Hour

The plant management insisted upon one-man operation in loading, weighing and hoisting of cars to kilns. We were able to accomplish this by the use of Jeffrey-Traylor electric vibrating feeders (patented) under the kiln stone storage bins. They load 5-ton cars in one-half minute. Two of these high capacity (600 T. P. H.) feeders are shown at the right.

Left—Jeffrey Type A Pulverizer processing spalls into agricultural limestone. It is fed by a Jeffrey-Traylor electric vibrating feeder. Investigate Jeffrey processing and handling equipment.



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GRINDING

mills closed circuited with air separators, and there are two 8- x 36-ft. cement mills closed circuited with air separators. At the start of operations no grinding agent was used in the finish mills, and the circulating load could not be maintained at more than 150 percent. This did not produce the desired results; so the use of T.D.A. was initiated, and it was then possible to step the circulating load up to 350-400 percent. This practice has produced results far above expectations, and herewith are the tabulations on the grinding results on the basis of barrels per hour ground in each of the ve mills:

		No T.D.A.	Using T.D.A.
		Circulating load 150%	Circ. load 350-400%
No. 1 Mill	9' 6" x 10' + 8' x 40'	* 140 bbl. per hr.	* 175 bbl. per hr.
No. 2 Mill	9' 8" x 10' + 8' x 40'	* 140 bbl. per hr.	* 175 bbl. per hr.
No. 3 Mill	9' 6" x 10' + 8' x 40'	* 140 bbl. per hr.	* 175 bbl. per hr.
No. 4 Mill	8' x 36'	* 85 bbl. per hr.	* 115 bbl. per hr.
No. 5 Mill	8' x 36'	* 85 bbl. per hr.	* 115 bbl. per hr.

* Ground to a fineness of 98 percent passing the 200-mesh sieve, and a surface area of 1850 to 1900 sq. cm. per gram as determined by the Wagner turbidimeter.

It is only through the use of T.D.A. that the 350-400 percent circulating load can be maintained and this is the most important single factor in stepping up the grinding capacity. Other favorable results derived from the use of T.D.A. have been the reduction of ball wear to a minimum, and the elimination of the problem of the finished cement "hanging up" in the storage silos.

Herewith is a transcription of an average analysis on this cement.

Oxides	Percent
SiO ₂	23.1
Fe ₂ O ₃	3.2
Al ₂ O ₃	4.3
CaO	65.9
MgO	1.1
SO ₃	1.5
Na ₂ O .....	.4
K ₂ O .....	.1
Ign. loss .....	.4
	100.0
Compounds	Percent
C ₂ S	55
C ₃ S	25
C ₄ A	6
C ₃ AF	10
CaSO ₄	2.5
Free Lime .....	.35
Insoluble residue .....	.05
Autoclave expansion	+ .01

The action taken at this plant in stepping up production is exemplary of the "all out" effort being made by American manufacturing interests.

The finish grinding capacity of the plant has been increased from 14,000 bbl. per day to 18,000 bbl. per day, enabling Permanente to help meet the heavy demands made on the cement industry at this time by the war.

Lehigh's Alsen Plant

(Continued from page 36)

200-mesh is required. This specification is met at the rate of 81.9 bbl. per mill hour (both mills) as compared to 75.3 bbl. when grinding, with the air separator, to 1800 sq. cm. per gram on other cements.

Originally, both mills were operated as compartment mills, but the

into the preliminary mill are taken, 10 lb. out of each 300 bbl., for the clinker autoclave test required by the State of New York. A continuous sampler catches samples of the finished product as it flows from the air separator to the cement pump. A bag type dust collector also serves this department, discharging in the screw conveyor feeding the air separator. Future plans provide for a second preliminary mill and for a second air separator on the final grind.

Storage and Packing

A 6-in. F-K cement pump, supplied air at 35 p.s.i. from a 759 c.f.m. compressor, delivers the cement into storage as it comes from the air separator in the finish grinding circuit. Storage totals 244,500 bbl., of which 64,500 is in the old stockhouse and 200,000 in a new stockhouse. The new stockhouse, consisting of 30 reinforced concrete silos and 17 interstices, was built by the Nicholson Co. and rests on solid rock 10 ft. below the ground level.

Three portable 8-in. F-K cement pumps are used to pump the cement from any silo into another, or to the packhouse or the bulk railroad car-loading station. Rotary valves release the cement into the pumps, which are supplied air from two air compressors (1582 and 473 c.f.m.) at 35 p.s.i. Bag-type dust collectors vent the silos. Cement is packed by two 4-spout packing machines and is shipped either in bulk cement cars, or by sacks in cars or sacked for shipment down the Hudson river.

Dewey Builds New Mill

DEWEY PORTLAND CEMENT CO., Dewey, Okla., is building a new, two-story building to house the raw grinding department of the plant, which will cost about \$40,000. An experiment is being made in the use of the Gunite method of construction to erect the walls. Instead of pouring concrete into forms, the walls will be built by shooting the concrete into a steel mesh framework.

Free Air-Raid Sand

TWIN CITY SAND AND GRAVEL CO., Centralia, Wash., has donated sand to this community for civilian use in combatting fires caused by air raids. The sand was hauled to the grounds of the city's six grade schools. Local civilian defense officials have asked all residents to have two pails of dry sand available at each home.

division plates were opened up and the grinding media are now ¾- and ½-in. forged steel balls. Screw conveyors and a bucket elevator complete the circuit with the air separator.

Feeding material into the mills is patterned along the lines of the kiln feed mechanism, having two streams of material circulating in parallel horizontal screw conveyors, with horizontal screw conveyor feeders undercutting both at right angles and discharging into the tube mills. One conveyor carries a continuous stream of fresh material from the feed bin; the other, 16-in. diameter, (farthest from the mills) carries the rejects from the air separator.

With this arrangement, the two feed screw conveyors will take the rejects first and their barrels will then fill up from the fresh feed stream. In this way, variations in the amount of rejects will not influence the rate of feed into the mills, since the feed screw barrels are always full and there will be a tendency to prevent excess circulating loads from building up. Rate of speed of the conveyors can be varied. Excesses in the fresh feed conveyor overflow into the bucket elevator filling the feed bin. A magnetic drum at the head of the elevator carrying the tube mill product to the air separator catches tramp iron.

Samples of the clinker being fed

THREE OUTSTANDING DEVELOPMENTS:

The Vanderwerp Recuperator for Rotary Kilns

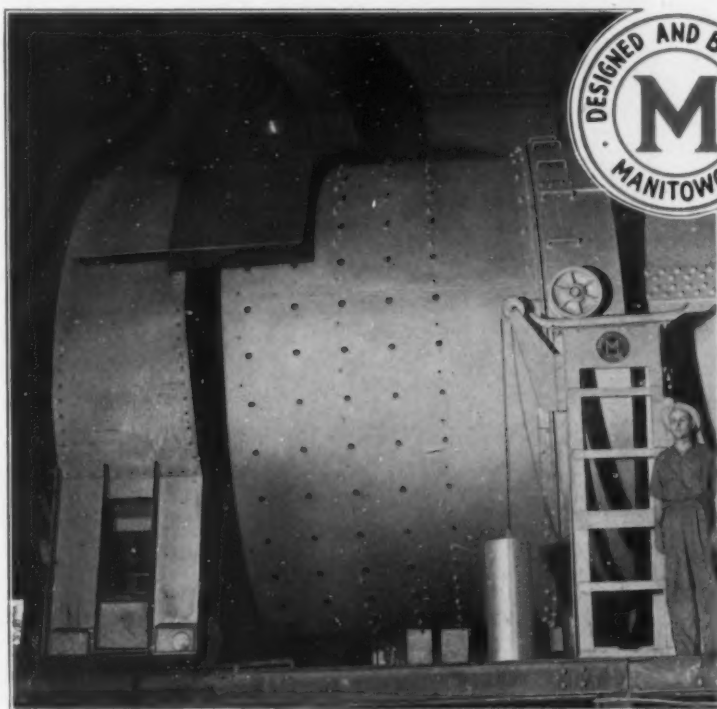
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Vanderwerp Type S Recuperator applied to Unit-Fired
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The demand for units of high
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of maximum output. In all cases
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attached to an existing kiln, re-
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in erection, involving no foun-
dations or brickwork and occu-
pying minimum floor space.

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10. Unit dust hopper

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PAPER: Multiclones recover lime dust from kiln stacks.

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Save Fuel By Using Slurry Filters

**Medusa Portland Cement Co., Silica,
Ohio plant increases clinker production
and conserves fuel with filter installation**

AFTER A LAPSE of eight or ten years, during which wet process portland cement plants leaned toward long kilns to conserve fuel, slurry filters are coming back. The Permanente Corp., San Jose, Calif., newest mill in the United States, has filters; Medusa Portland Cement Co. is just completing the installation of three units at Silica, Ohio; and another large eastern plant is putting in filters.

Medusa's installation at Silica, Ohio, the first in the portland cement industry made by The Eimco Corp., is outstanding since the filters are among the largest continuous disc filters yet installed—certainly, they are the largest for 10- x 150-ft. kilns. The trouble with many of the earlier installations was that they had insufficient capacity and later required the heating of slurry to step up the rate of filtration.

Reduce Fuel Consumption

Filters were put in at the Medusa mill principally to conserve coal, which has recently increased about 15 percent in price. Operating results can only be given in approximate figures since they are based on but a few months' operation of two units, during which no attempt has been made to push kiln production to the maximum.

With just a few months' preliminary operation to go on, fuel consumption has dropped considerably. After the filters had been installed it was found desirable to step up the slurry consistency from 35 percent moisture to 40 percent. This was done to facilitate handling through pipelines and to prevent segregation in the filter tanks, but it has increased the grindability of the raw materials and improved the uniformity of the slurry, through better control.

Filter cake, as fed into the kilns, contains about 18 percent moisture which means that about 150 lb. of water per bbl. of production is removed through filtration.

Production of clinker also has been increased per kiln hour. The waste heat boiler efficiency is much improved. Each kiln has a separate 761-hp. waste heat boiler, with its economizer and induced draft fan, and all three exhaust through a common stack. Stack gases had a temperature of 1100 to 1200 deg. F. upon entrance into the boilers when unfiltered slurry was fed into the kilns. It is estimated that the temperatures are now several hundred degrees higher.

Early installations of slurry filters are known to have increased steam generation in the neighborhood of six to eight percent, which might be an indication of the increased power now available. The plant can be operated by the power generated from waste heat boilers, without firing auxiliary coal-fired boilers used frequently before.

How Filters Are Installed

Each filter is installed just over the feed end of the kiln and its source of slurry is a 1000 bbl. storage tank (3) of corrected slurry on the ground level below. Slurry is ground to 98

percent minus 100-mesh through Kominuters in closed-circuit with Tyler Hum-mer screens, followed by tube mills. After blending and correction, it is pumped into the correction tanks, from which a 4-in. Wilfley slurry pump (3) elevates the slurry into ferris wheel feeder tanks at the filters.

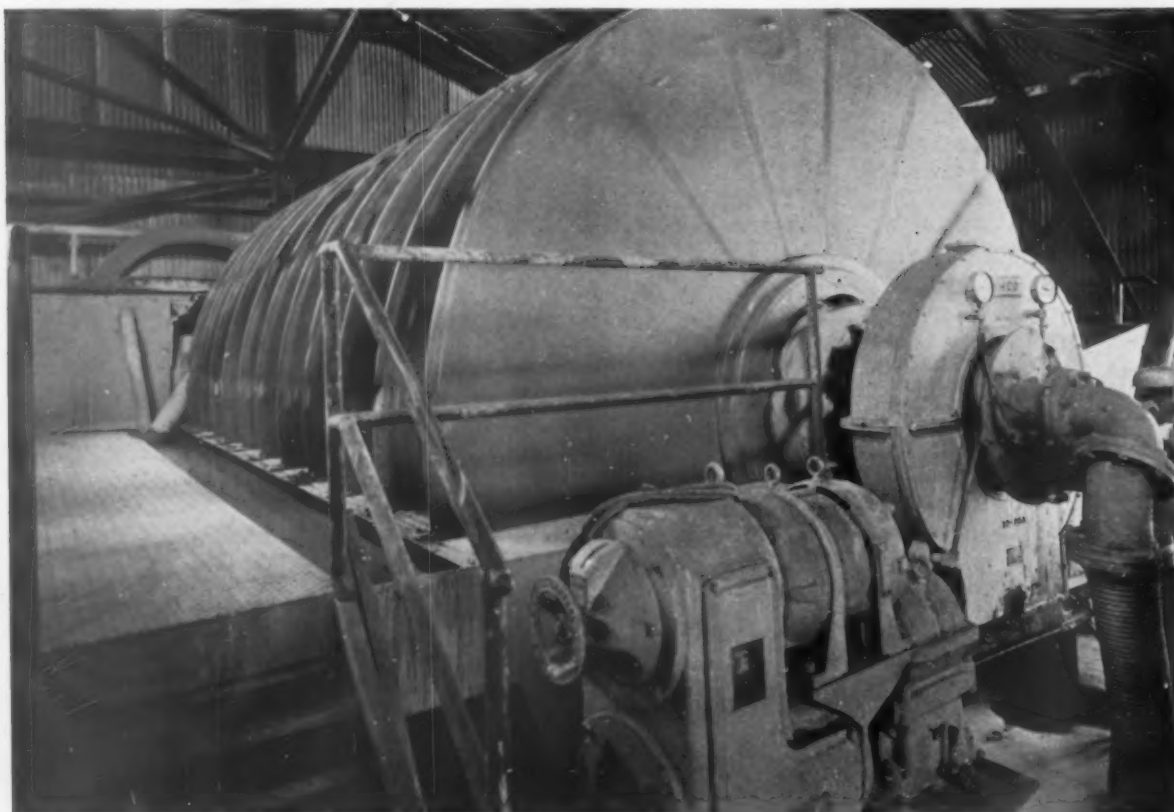
The filters each have 11 discs, 12-ft. 6-in. in diameter, with 16 sectors to the disc. Overall, a filter tank measures 24-ft. 4 $\frac{1}{2}$ -in. long and the filter has 2398 sq. ft. of filtering surface. It has a direct-gear electric motor drive, through a Reeves gear reducer connected to a 2 $\frac{1}{2}$ - to 7 $\frac{1}{2}$ -hp. Howell motor with four speed ratings.

An Eimco automatic valve controls the cycles of cake formation, washing, drying and discharging. Filter cake is discharged by gravity aided by a slight inflation of the filter cloth, automatically operated through the valve. Cake is removed by rubber-edged blades.

Each of the ferris wheel slurry feeders has 12 buckets, and there is an adjustable pulp level weir on each tank. Control is based on hav-



Method of feeding slurry filter cake into kilns. Cake drops on to belt conveyor and is then mixed with kiln and boiler housing dust in pug mill on the right. Inclined chute carries dust to pug mill



One of three new slurry filters which reduce moisture in slurry to 18 percent. There is a four-speed drive on the machine

ing an exact required amount of slurry available to the filters all the time. The kilns are driven at a speed of either one revolution in two minutes or one in four. When the kiln speed is changed, the speed of the ferris wheel feeder automatically changes proportionately through inter-connected rheostats on the feeder and kiln drives. Slurry enters the filter troughs through a 4-in. pipe from the feeder tank and the operator regulates the speed of the filter, as the kilns are speeded up, to maintain the level in the trough.

Moisture in the feed slurry was increased from 35 to 40 percent to help maintain a uniform mix, to improve pumping and for a more uniform distribution of slurry in the filter troughs, to insure a level throughout that is necessary to maintain a vacuum. Filtered water flows by gravity into a trap from which it is wasted. A second water trap removes the water ahead of the vacuum pump. Channels are provided inside the cast iron filter shaft for the movement of filtrate, wash water and blow-back air.

Pug Mill Mixes Dust with Slurry

Filter cake is discharged on to a horizontal 24-in. belt conveyor, with Link-Belt idlers, that carries the cake to a pug mill just over the kiln feed chute. There it is mixed with dust reclaimed from the kiln and boiler housings, just before discharge into the kilns.

Until the filters were put in, dust so reclaimed from all the kilns was fed into one kiln, but now it is divided evenly between the kilns. Screw conveyors and elevators put the dust into 7-ton bins (3) near the pug mills. Dust is drawn from the boilers and kiln housings once each shift and is fed uniformly from the bin into the pug mill by a 6-in. enclosed screw conveyor.

The addition of the dust to the filter cake partially dries up the wet surfaces and helps to prevent sticking in the kiln feed chute which is of special heat resistant steel, covered with asbestos near the bottom end. It also helps prevent mud rings and reduces the moisture in the cake, possibly by $\frac{1}{2}$ percent. It is necessary

to have a pitch of about 45 deg. to the kiln feed chute to prevent the filter cake from backing up into the boilers. Each kiln will have spiral lifters at the back end of the kiln to augur the filter cake into it as fast as the feed comes in, thus preventing the formation of mud rings.

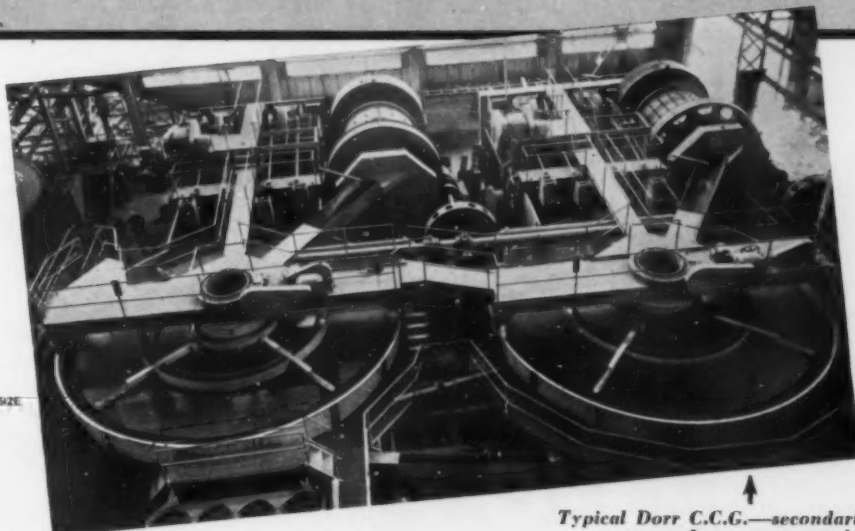
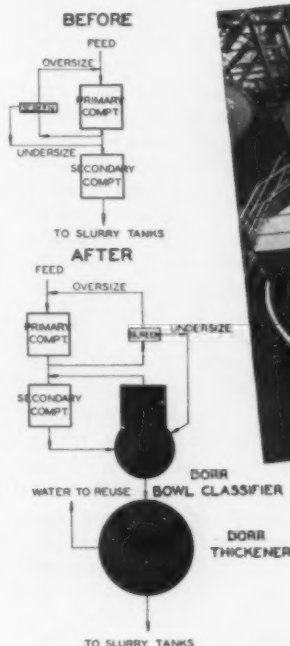
Engineers of the Medusa Portland Cement Co. designed the filtration plant layout in cooperation with the Chicago office of The Eimco Corp.

Organize Plant Guards As Military Units

ARREST of eight highly trained German saboteurs has brought about plans by the War Department to organize civilian plant guards as an auxiliary to the Army's Corps of Military Police. Each guard unit will be commanded by an officer or non-commissioned officer of the Army of the United States, and will undergo such training as will enable it to supplement the Army in resisting attack on war material, war premises, and war utilities which the force is assigned to guard.

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A Better Finished Cement?



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at another west coast plant.

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97 per cent—
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An improvement in quality because of
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- ★Installed Cost Dorr C.C.G.
Approx. \$95—100 per bbl. per day
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The "before and after" sketches at the left show just how this switch from open to closed circuit was made by Calaveras Cement Company, San Andreas, California, well-known manufacturers of white cement and other cement products. The data tabulated show our best estimates of

the advantages to be expected in this typical modernization program.

Increased raw grinding capacity is secured without adding any more grinding mills. The finer raw grind means not only a sounder final cement, low in free CaO, but an increase in the capacity of the kilns and finishing mills. This new capacity plus reductions in power and other costs should repay the cost of the change-over in less than one year.

We would like to show you facts and figures on such an installation.



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Between Wars

Portland Cement Industry Expands, Retracts, and Is Detracted

BETWEEN World War No. 1 and World War No. 2 the American portland cement industry has had a romantic experience. Space and circumstances forbid our dwelling on other than the high spots of the technical phases—and this only to see if its second post-war development can in some degree be forecast from its first.

The experience of the portland cement industry is in most respects typical of that rapid development and expansion which in the case of the automobile and the radio industries attracted the attention of romantic writers who have produced volumes of glowing literature on American enterprise. It differs from these in having grown and developed largely without ballyhoo and from its own profits and the continuous investments of its own active members. Probably, today there is no other big American industry in which those active in the industry are more financially interested, and which has depended more on its own resources than on those of the public.

Opening Up New Markets

There is certainly no other American industry which has required more imagination in the development of new market outlets; for here we have a cheap synthetic mineral whose only use at the beginning of the American industry was for mortar in brick and stone masonry. To develop its use for concrete in massive monolithic engineering structures and intricate, fine and beautiful details in architectural works required imagination, fortitude and the patient, persistent application of all available engineering, architectural and research talent. Nor is its field of application yet covered, for even now new uses are in sight, never even dreamed of during the boom period following World War No. 1—the extension of soil stabilization, for example. Moreover, it is a product adaptable to changing conditions. With shortage of steel for reinforcement, builders and engineers are returning to unreinforced struc-

By NATHAN C. ROCKWOOD

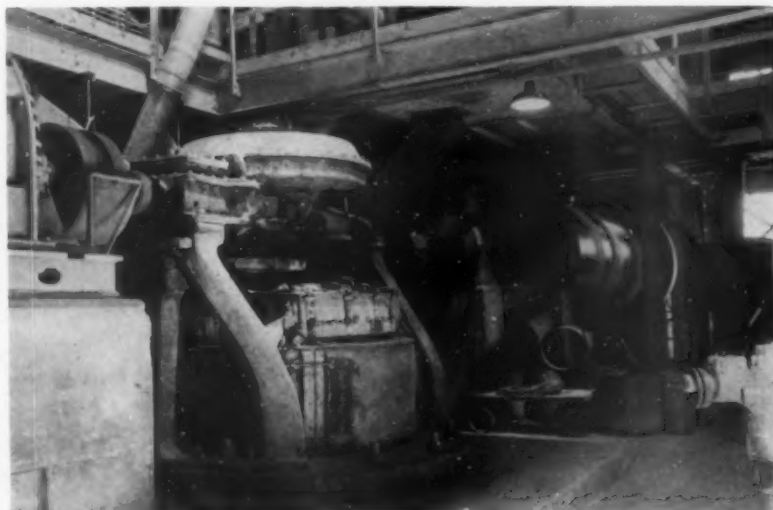
tures. Excellent concrete pavements were made in the early days without steel reinforcement. They are now being made without reinforcement. Perhaps it will be found that we depended too much on steel reinforcement, and that the same investment in a thicker pavement will result in a more satisfactory pavement.

Hand in hand with exploitation of product has gone constant improvement of product; and an increasingly more scientific approach to production problems. Nor has the humanitarian side of the industry lagged behind that of other industries, for the portland cement industry has pioneered in safety work and accident prevention; and its comparative freedom from strikes and labor troubles are outstanding. From dusty, dirty, disreputable plants formerly considered a necessity, working conditions in modern cement plants are equal to those found in any industry.

Developments in the primary quarrying operation of cement plants during the 25 years between wars

have not, of course, been confined to this industry, for much has been taken over from commercial crushed-stone quarry experience. Between 1919 and 1940 the amount of labor (in man-hours per barrel) in the quarry operation of cement plants was reduced by about 60 percent. This was accomplished by elimination of hand loading, the introduction of power shovels, larger crushers, mechanical transportation. Of course better technique in blasting, use of well drilled and more effective explosives also played a part in this.

TRENDS: The most recent trend has been to replace industrial railway transportation from quarry to crushing plant with heavy duty motor trucks, or semi-trailers. As the quarry face recedes farther and farther from the plant, in the older operations, there is a tendency to move the primary crushing plant to the quarry and to convey the crushed stone to the cement plant by conveyor belt. Since conveyor belts are said to be the cheapest of all methods of transportation for such materials, we may expect to see their use greatly extended in the future.



Preliminary clinker crushing for tube mill is now standard practice for tube mill is an inefficient crusher

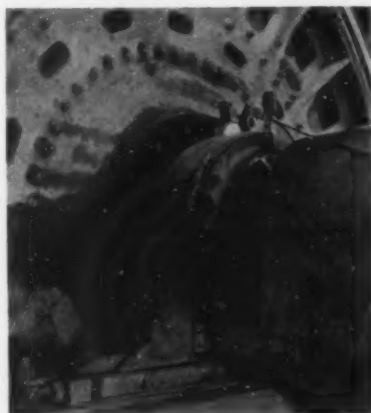
Crushing

Power shovel loading in quarries of course would never have been feasible without development of crushers large enough to take shovel size stone. In fact the first steam-shovels tried in cement-plant quarries in 1905 and 1906 were failures because no crushers built up to that time could take the output.

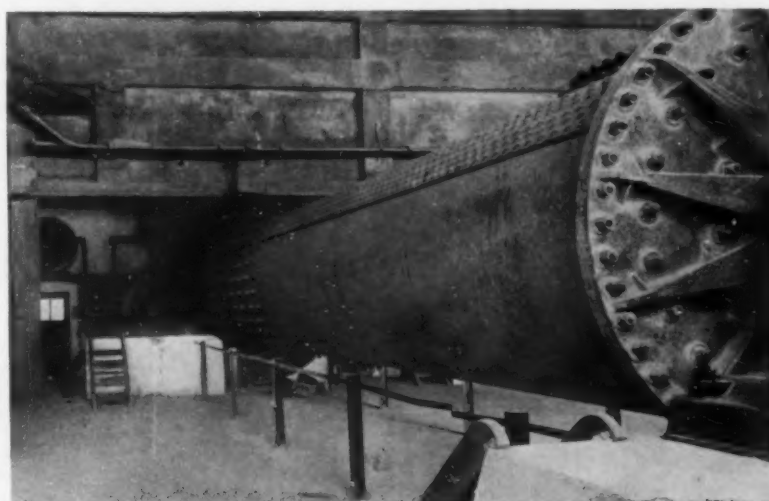
From an unpublished manuscript that Leigh Hunt, sent to us in 1933, we take the following extract on the first "big" crusher:

"Plans were being prepared for the Dixie Portland Cement Co. plant at Chattanooga, Tenn., and for the Hawkeye Portland Cement Co. plant at Des Moines, Ia. (1906). Bids were called for specifying a gyratory crusher with a 36-in. radial opening. As no such crusher had been put on the market, or even had been designed, the matter was submitted to the engineering departments of the Allis-Chalmers Manufacturing and the Power and Mining Machinery companies. Both companies admitted that the problem involved no serious engineering difficulties other than that the concave section would have to be split and bolted together on the job. They were fearful that this connection would be subjected to excessive strains, and they balked at the idea. The jump in sizes from a "No. 10" (then on the market) to a "No. 18" appeared too radical.

"Both companies refused to assume the responsibility. R. Bernhard, engineer of the Power and Mining Machinery Co., had been working diligently on the problem and had become enthused with the idea. He induced his company to assume the



Tapered roller bearings were tried as a solution of the big compartment mill drive problem



Good example of long compartment mill. It is a thing of history now

expense of the patterns. The company agreed to build the two crushers (one each for Dixie and Hawk-



Cone crusher installation for reducing clinker size ahead of compartment mills

eye) on a per pound basis. The conditions were that the purchaser would assume all responsibility for design and performance. These negotiations resulted in the first 'mammoth' gyratory crusher.

"Mr. Bernhard, subsequently chief engineer of the Traylor Engineering and Manufacturing Co., collaborated with the writer in developing this bit of history. He also designed the first large jaw crusher, with an opening 5 x 7 ft. and a later one 5 ft. 6 in. x 7 ft. 2 in. Mr. Bernhard said at this time (1932) that gyratory crushers up to 60-in. radial openings had been built, and that they could be built up to 84-in.

"The second of the two 'mammoth' gyratory crushers (the No. 18's) was not built until the first had been installed and tried out at the Dixie plant. In the light of subsequent

events it solved the problem of quarry shovel operation. It was not so considered at the time. Quarry operators held the Edison rolls and the multiple jaw crushers to be the pioneers in the field. The waning popularity of the Edison machines was perhaps due to the fact that they could not be purchased outright, and installations on a royalty basis were not popular with cement and quarry operators."

Of course all that was prior to the last 25 years between wars, but we could not resist mentioning it as proof that there is real romance in the technical development of the American portland cement industry. Here, as in every other industry some stout-hearted enterpriser wanted something that never had been made before, and an equally stout-hearted manufacturer was always at hand to deliver the goods.

TRENDS: During the past decade the 84-in. gyratory crusher has never been built, but some new 60-in. crushers have been; so it may be assumed that there is no call for a larger gyratory crusher. The trend of the past few years has been toward the use of high-speed short-shaft secondary crushers for primary reduction of clinker ahead of the tube or compartment mills. For a long time, cement plant operators, although they recognized the desirability of reducing the size of raw materials by stages, continued to feed clinker up to 2½ in. or larger to the tube and compartment mills. A tube mill is a very poor device for crushing, and any feed larger than ¼ in. requires

crushing rather than milling or grinding. The trend will continue toward the use of more crushers as preparation for both raw and clinker grinding.

For this secondary crushing (and preliminary grinding) hammer mills and ring-roll mills of special size and ruggedness were developed, and are

largely used. Their special place in the flow sheet was made more secure by the development of air separation, which permits removal of the finished product without further grinding, and has thus been an important factor in getting more efficiency from the tube and compartment mills.

That appears to have been the limit reached in length of mills. About that time air separation and stage grinding came more prominently into the picture and the craze for constantly bigger units ceased, probably for all time. Since then short mills (up to 10 ft. long), in diameters up to 9½ ft. have been made.

Raw Grinding

IN RAW GRINDING, progress toward larger and larger units was rapid until about 1935, when it became apparent that very large mills had reached their economic limit in the 8- x 50-ft. size. Difficulties were experienced in building adequate bearings and providing sufficient structural strength in the shells. Also stage grinding came to be recognized as more economical in the long run than attempting to do the whole job in one machine.

The first tube mill used for grinding raw materials in the cement industry was in Russia in 1893. It was a batch machine. The first continuous discharge tube mill was invented and patented by M. K. Davidsen, of F. L. Smidth & Co. in 1895, and the first ones used in the United States were by the Barber Asphalt Co. and the Standard Silica Co. in New York. The mill at the Standard Silica Co. was used for grinding sand-cement. The first cement company to use one was the Glens Falls Portland Cement Co. in May, 1895.

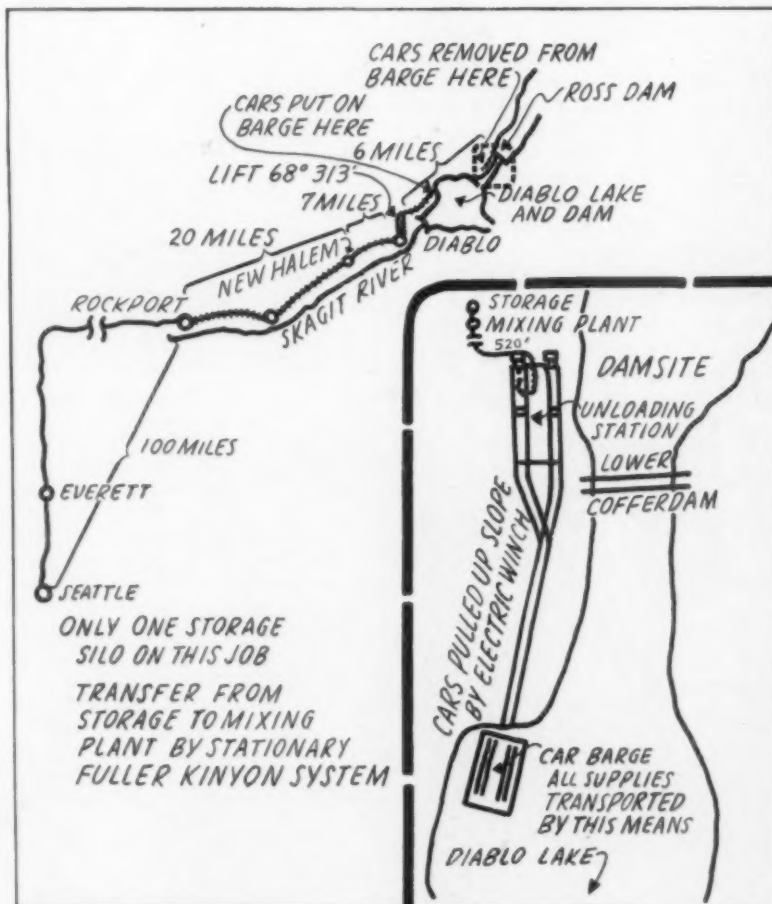
Prior to the first world war the largest tube mill appears to have been one of these Davidsen-Smidth & Co. mills 7- x 30-ft., carrying a grinding media load of 100,000 lb. The early mills were lined with Sillex (a natural European flint) with imported silica pebbles. Cylindrical grinding media of iron or steel (Cylpebs) were first used about 1911. The same year P. T. Lindhard, of F. L. Smidth & Co., invented the first compartment mill, with a relatively long preliminary grinding chamber and a short finish grinding section.

The Gates Iron Works, one of the original companies acquired by the Allis-Chalmers Manufacturing Co. in 1901, was a pioneer American manufacturer of mining and cement machinery and the Gates flint pebble tube mill was much used in the early Pennsylvania and Michigan cement plants. By 1915 the Allis-Chalmers Company was making 7- x 22-ft. tube mills with metallic grinding media (Compebs).

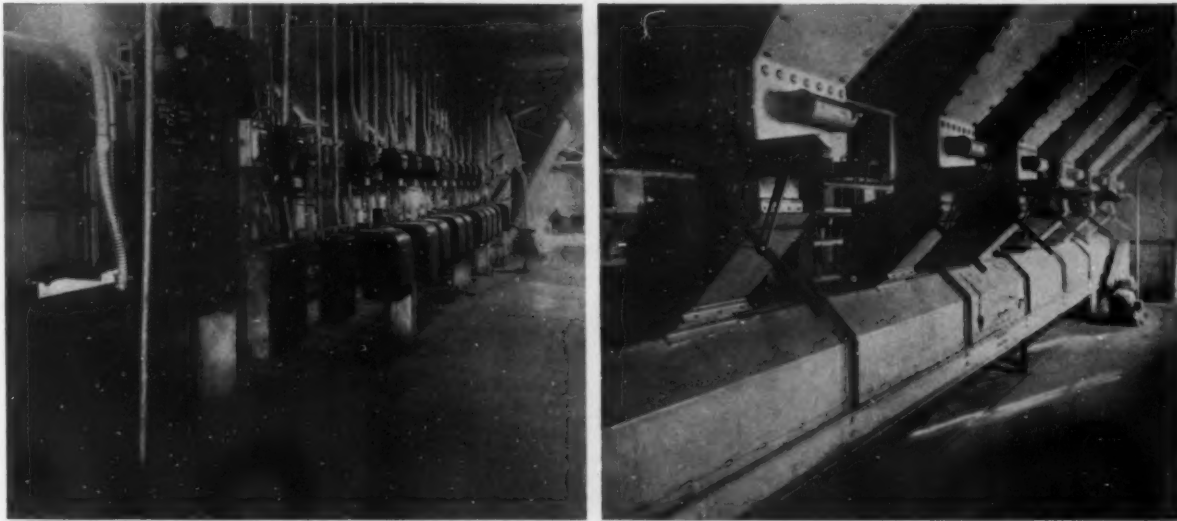
The Traylor Engineering and Manufacturing Co., another large manufacturer of tube and compartment mills, has furnished a very interesting record which shows how the mania for bigger and bigger mills grew in that 25-year inter-war period.

1922—7- x 26-ft. tube mills	
1924—8- x 26-ft. " "	
1926—8- x 40-ft. compartment mills	
1927—8- x 47-ft. " "	
1928—7- x 50-ft. " "	
1928—8- x 40-ft. " "	
1935—8- x 50-ft. " "	

The use of these very large mill units involved special problems in electric motor drives, for the starting load to overcome the inertia of the mill is tremendous. The early tube mills were driven by direct-current motors which could take large overloads, but when alternating current became universal for large motors, the Allis-Chalmers company developed the synchronous motor of 500 hp. for this purpose and made the first installations in 1918. Since then General Electric Co. and Westinghouse Electric and Manufacturing Co. have also developed special syn-



Illustrating possibilities in transportation of cement by pumping. Cement removed from bulk loaded cars and placed in storage by pump, and from storage moved by air pump to mixing plant



Accurate proportioning and blending of raw materials—a very probable early development. Illustrations show the control panel for blending plant, to the left, and six of seven analysis tanks, to the right, which are used in checking blended raw materials

chronous motor drives for these large mills to over 1000 hp.

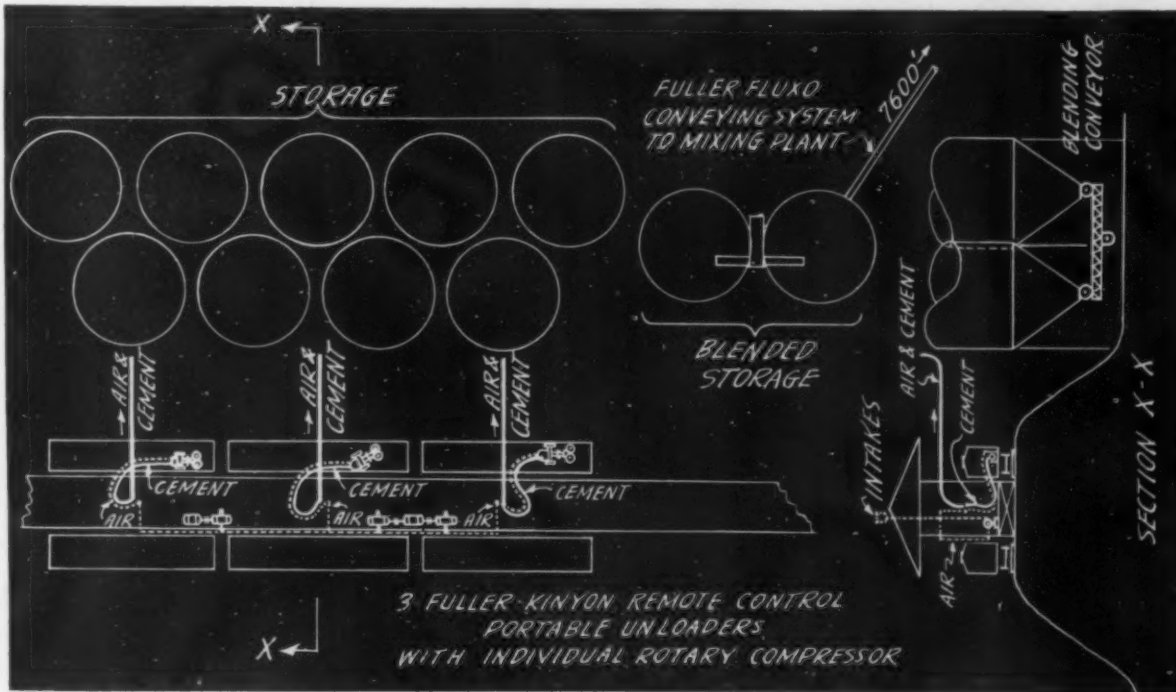
TRENDS: The most pronounced trend is toward selective grinding of the various raw materials, limestone, shale, silica, etc. They probably will more often be handled and ground separately, not only to provide for more accurately proportioned blends, but to avoid over-grinding of the

most easily reduced component. It is now recognized that raw materials can be too finely ground for best results.

Wet vs. Dry Grinding

Throughout this period between 1917 and 1942 the controversy over the relative merits of wet and dry processes of manufacture was upper-

most. It appears to have been laid to rest now for all time, since it is generally admitted that so far as quality of product and control of manufacture are concerned, the modern dry process plant is in every way the equal of the wet process. Even the one-time potent argument of dust elimination in the wet process over the dry, has largely lost its weight

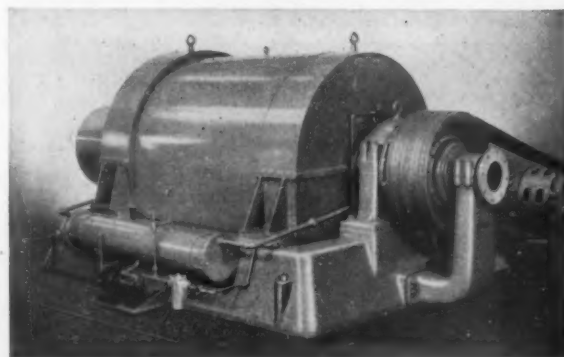


Unloader and storage layout at Grand Coulee and proper relation between compressors and unloaders

LONE STAR *puts*
1,000,000 BARRELS
OF CEMENT SLURRY

Through the

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CENTRIFUGAL CLASSIFIER

Lone Star Cement Corporation installed one 54" x 70" Bird Classifier at their Houston, Texas plant a year ago. Since then over a million barrels have been put through this machine.

The slurry handled is that discharged from the secondary grinding circuit and no dilution or dispersion is required. The classified fines go to the kiln and there is no material increase in the quantity of water to be evaporated.

Through closed circuiting of the Bird Classifier with the secondary grinding circuit, mill capacity is increased and a kiln feed of uniform fineness is obtained.

This one compact unit, taking up only 135 sq. ft., is doing the whole job and going strong.

For further information about the Bird Classifier get in touch with

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in the newer installations equipped throughout with efficient dust collectors.

Apparently dry raw grinding with air separators in closed circuit is somewhat simpler in flow sheet and space requirements than wet grinding. In any event, in the face of the stampede to the wet process during the 1920's, many of the older dry process plants held their own, and a few manufacturers had the courage to build new dry process plants. The general adoption of air separators, pneumatic pumps and the dry blending systems introduced by Fuller Co. and Polysius Corp., undoubtedly were important factors in saving the dry process.

The most interesting aspect of this old controversy, and perhaps, the most enlightening, is the history of the Alsen, N. Y., plant of the Lehigh Portland Cement Co. It was originally a dry plant, was converted to wet, and within the last two years reconverted to a modern dry process operation. From which it may be assumed that there are no inherent advantages now in the wet process, where the materials are adaptable to dry grinding and processing.

The wet process does have advantage when the materials have to be processed to remove unwanted ingredients, or to increase the calcium carbonate content. Froth flotation and sedimentation, or thickening, by hydraulic methods are thus far the only feasible methods, although there are possibilities in dry processing here also.

TRENDS: Apparently there is no longer room for argument over the wet vs. dry method as to quality and control of product. There are factors which enter into the choice of method, such as the character of the raw materials and the ease or difficulty of preparing them in proper proportions; the need or desirability of making power from waste heat; the importance of fuel economy to the particular operation.

Any latent disadvantages in the dry process, caused by lack of uniformity in the mix, can be overcome by a method observed at one of the older plants. Here the reserve of crushed limestone is stored in piles built up in layers by motor trucks near the mill. Recovery by power shovel scoops through the layers from bottom to top, insures a blend of practically uniform material. The shale is similarly handled and blended. We have suggested in a previous

issue of *ROCK PRODUCTS* that such blending could be done with scraper or "carry-all" types of excavating and haulage units. We believe much

more attention will be paid to such details in the post-war period. It saves a lot of last-minute blending of pulverized raw materials.

Kilns and Coolers

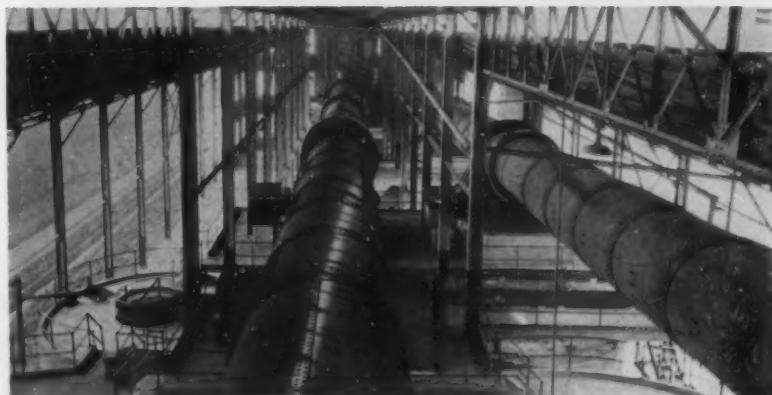
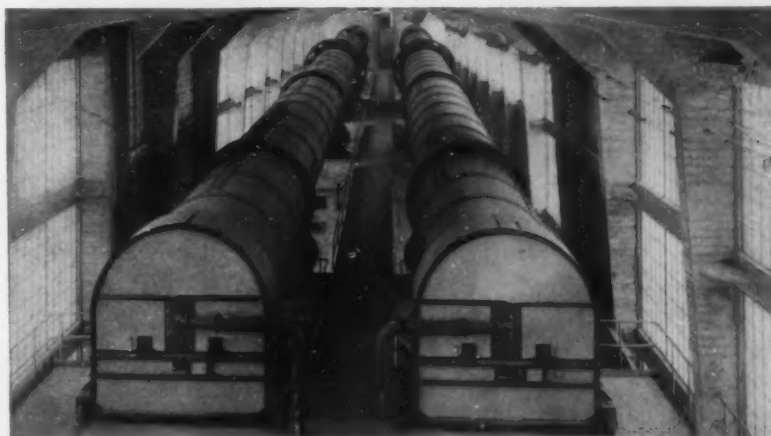
IN 1917 some 73 out of 789 rotary kilns in the portland cement industry were over 150 ft. long. There was not then and never has been any very scientifically determined proper length for a rotary kiln. The diameter was early fixed at a maximum—11 ft. 3 in.—as the limiting width of a piece of equipment that the railways could handle. There are a few kilns of larger diameter. One will find that during the new plant building boom in the 1920's kilns 240 ft. long were quite popular.

Leigh Hunt, in the unpublished manuscript already quoted, gives an amusing story of the origin of the 240-ft. kiln. He writes: "A. C. Tagge (now deceased, president of the Canada Cement Co.) told the following

story. The writer (Leigh Hunt) had been commissioned in 1913 to design a plant for the Canada Cement Co., which had just completed a building and remodeling program, installing 10- by 150-ft. kilns. The writer, who had done some experimental work on the scientific relationship of diameter to length of rotary kilns, used the ratio of the kilns at the St. Mary's Portland Cement Co. plant 1.00 to 5.65 and recommended 10- x 250-ft. kilns, linings and coatings considered.

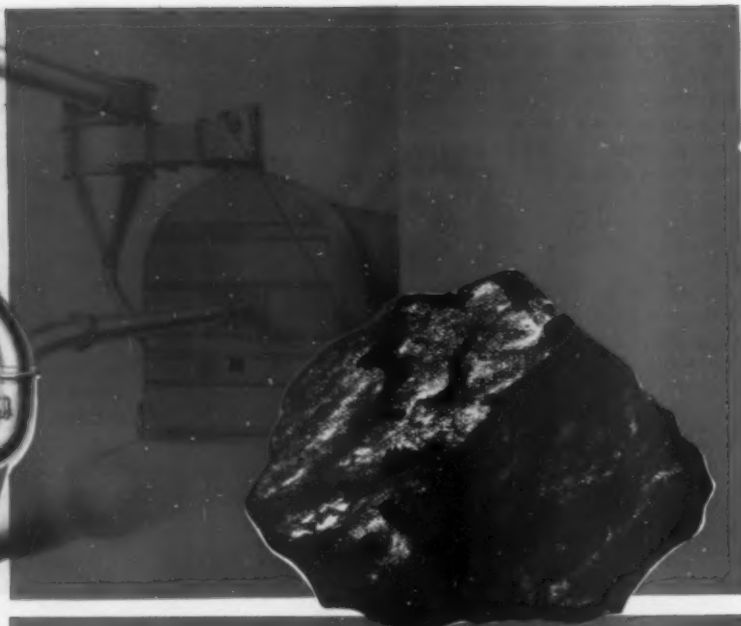
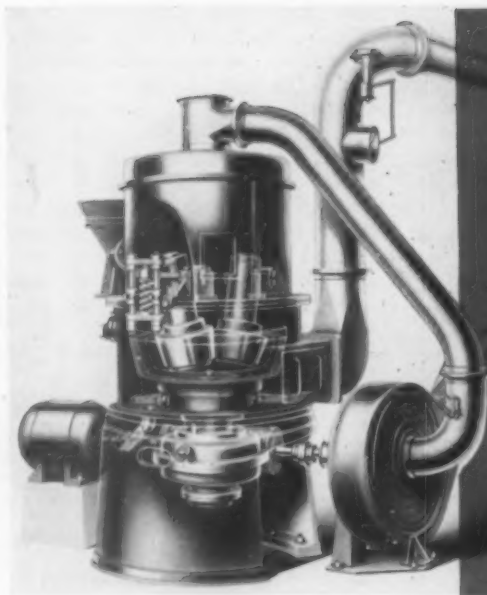
"After three weeks of argument at Montreal, between Mr. Tagge and L. L. Stone, an associate of the writer, Mr. Tagge (then general manager) had conceded 230 ft. to be about right, but would go no farther. To

(Continued on page 54)



Contrasts in kiln buildings. Above: Construction where there is plenty of rain. Below: Structure more suitable for warm-weather locality

RAYMOND BOWL MILL



... *Now*

ON THE FIRING LINE

With cement production being pushed to a maximum, the Raymond BOWL MILL is on the *direct firing line*, helping to maintain 100% kiln capacity, 24 hours a day, month after month, without shutdowns.

It is built-to-order for the heavy-duty service and trouble-free operation that are demanded today. It is doing a wonderful job in more than 500 installations: including rotary kilns for burning cement, lime and magnesite; boilers and furnaces for many processes.

Why the BOWL MILL is first in *direct firing*:

- Simplified control system for sustaining peak operating efficiency
- Arrangement for lubrication and adjustment from outside while mill is running
- Ability to handle any grade or moisture coal and maintain uniform fineness
- Noiseless, vibrationless, dustless operation

Conserve gas and oil for military needs by changing over to the BOWL MILL for direct firing your kilns with pulverized coal.



For further data on the BOWL MILL, write for Catalog No. 51.

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RAYMOND

MECHANICAL AIR SEPARATOR

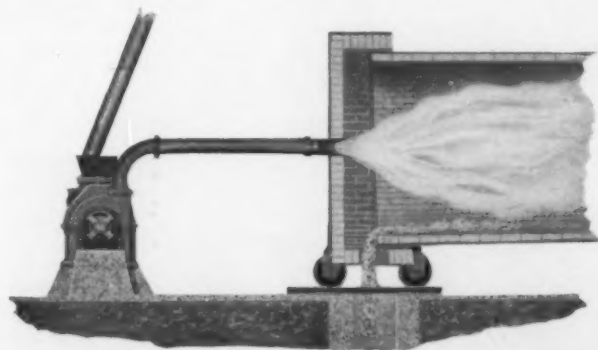
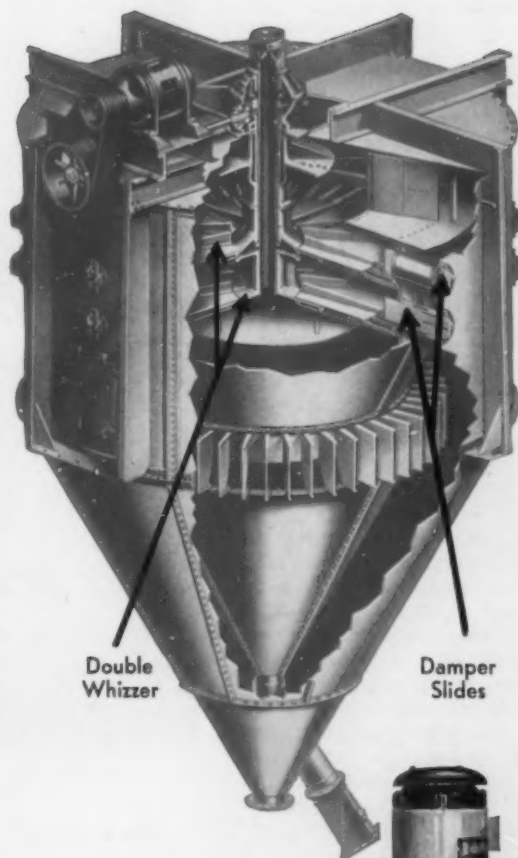
with Double Whizzer

You get the advantage of the latest developments in separator design when you use this Raymond unit in your closed circuit grinding operations.

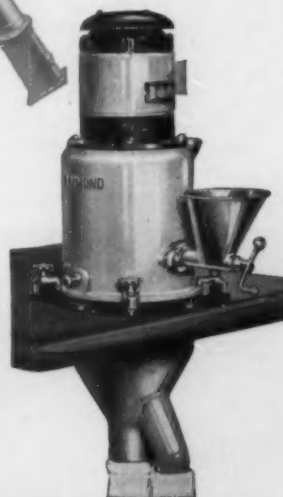
In classifying cement, the *double whizzer* feature enables you to meet today's strict specifications with utmost economy. It provides close control of particle size, and insures maximum surface areas. It results in greatly increased production in the high fineness range.

If you are producing different grades of cement with the Whizzer Separator, it is easy to regulate the fineness within wide limits . . . from standard cements to the high early strength cements . . . simply by means of the damper slides . . . no internal adjustments are necessary.

Also for other materials . . . lime, gypsum, slate dust, clay, chemicals, graphite, limestone, silica, talc, and along practically the entire list of minerals and manufactured products . . . the Raymond Whizzer Separator will give uniform, low-cost products.



For direct-firing rotary kilns of relatively small capacities, the Raymond IMP MILL is recommended for low-cost operation.



The Raymond
LABORATORY SEPARATOR

A compact, motor-driven unit which is useful for experimental work as in classifying test samples.

RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.

1307 North Branch Street

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(Continued from page 51)

settle the question, Mr. Jones, president of Canada Cement, requested the writer (Leigh Hunt) to present a formula and to break the deadlock. The outcome was as follows: Tagge plus Hunt divided by two equals 240

$$\frac{T + H}{2} = 240 \text{ ft.}$$
 This com-

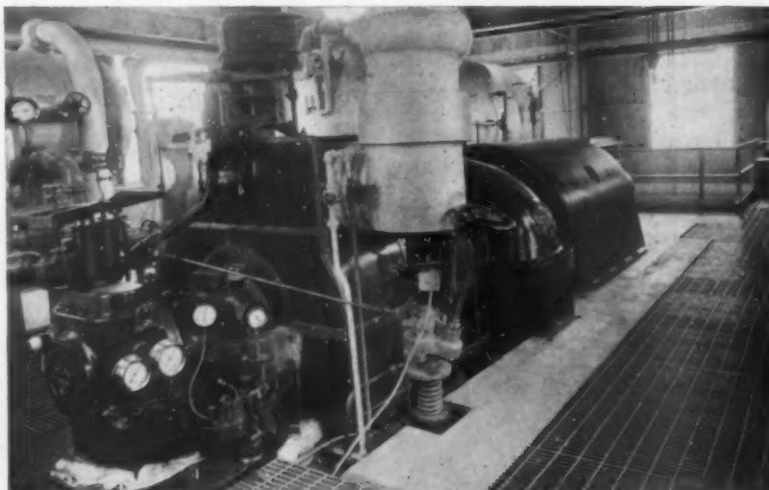
promise established a kiln dimension which was considered 'scientifically correct.' Afterward, many prominent cement men, including Carl Leonhardt, advocated the 240-ft. kiln as being ideally dimensioned."

In this issue is a description of the longest kiln installed in North America today — 475 ft. for the Hawkeye, Des Moines, Ia., plant of the Marquette Cement Manufacturing Co. Prior to that the Permanente Corp. kilns in California held the record with a 464-ft. kiln.

These very long kilns are all-welded — an innovation in kiln and mill shell construction that was largely pioneered by the Traylor Engineering and Manufacturing Co.

Mr. Hunt's story of Canada Cement Co.'s rebuilding to 150-ft. kilns and settling on a 240-ft. length for a new plant is interesting as showing the constant rebuilding a large cement company has to go through to keep up. As he says, hardly had they completed rebuilding with 150-ft. (dry process) kilns than the period of long, wet-process kilns came in and Canada Cement Co. gradually replaced all the 150-ft. dry process kilns with constantly longer wet-process kilns, until it reached 420 ft. at its Port Colborne, Ont., plant.

TRENDS: For a long time it looked as if the very long kiln with chains for heat exchangers was the answer



Two types of cement plant power houses. Above: A modern waste-heat installation. Below: Diesel power plant comprising 8200 hp.

to economic heat utilization. Building of waste-heat boiler plants largely ceased. Installation of slurry filters stopped for the time being (about 1932). However, in addition to the trend toward longer and longer kilns,

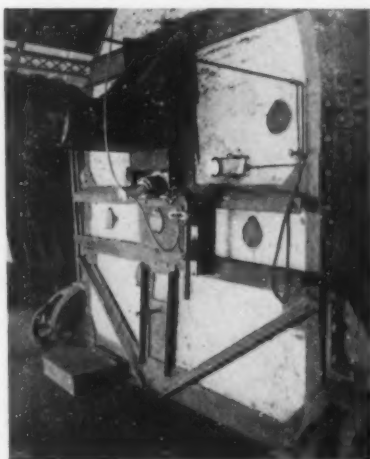
coal was cheap; the cement manufacturers as large coal users, profited from the depression of the coal industry. Consequently, there was not the incentive to fuel economy there had been in the boom days of the



Clinker coolers of the past being replaced by clinker conditioners in modernization programs



Another older type clinker cooler with pan conveyor below kiln discharge hoppers



Old kiln with modern "trimmings"

20's when strikes, car shortages and increases in freight rates sent up the cost of fuel rather quickly.

Government price-fixing in the coal industry—with the prospect of constantly increasing wages and costs and prices—and increases in freight rates, taxes, etc., have changed the picture again and we see revived interest in fuel economy. Slurry filters are now being installed and waste-heat power plants are again in the picture, both as a fuel economy and as a safeguard against power shortages and power rate increases. The most interesting example of this trend is the new Hawkeye plant of the Marquette Cement Manufacturing Co. which has both a very long wet-process kiln and a power plant; but since the exit gases of the kiln are not expected to be more than 250 deg. F., the power plant will not use waste heat, but will depend on an independent boiler plant.

The real reason for the 450- to 500-ft. cement kiln's increasing popularity probably is its very large capacity. Kilns of this size are producing around 3000 bbl. of portland cement per day, or about twice what kilns half their length produce, and with somewhat better fuel ratios.

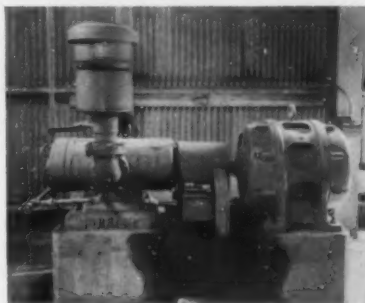
Since fuel economy is again getting more attention and since considerable attention has been given in the last few years to heat-control and recovery equipment and instrumentation, we believe the time is ripe for cement manufacturers to turn again to such heat savers as slurry filters and waste-heat boilers for their short kilns. The initial manufacturing research of the Portland Cement Association was on heat conservation.

Since then it has gone into grinding and air-separator problems, and more recently into proportioning raw materials and its problems, particularly those arising from segregation of raw materials according to their chemical or mineralogical composition. Heat utilization by means of

waste-heat boilers, however, has come into conflict with efficient kiln operation for heat conservation, since it is impossible to have an efficient power plant and low B.t.u. consumption in the kiln at one and the same time. Power requirements have grown since some of the early installations.

Burning Equipment

TWENTY-FIVE YEARS AGO every cement plant which used coal for fuel had to operate a separate coal drying and pulverizing plant. Undoubtedly the most outstanding technical development in the industry during this period was the switch over to unit coal dryers and pulverizers directly connected to the kiln, and really a part of the kiln unit. At first the elimination of the explosion hazards of a separate coal-pulverizing plant



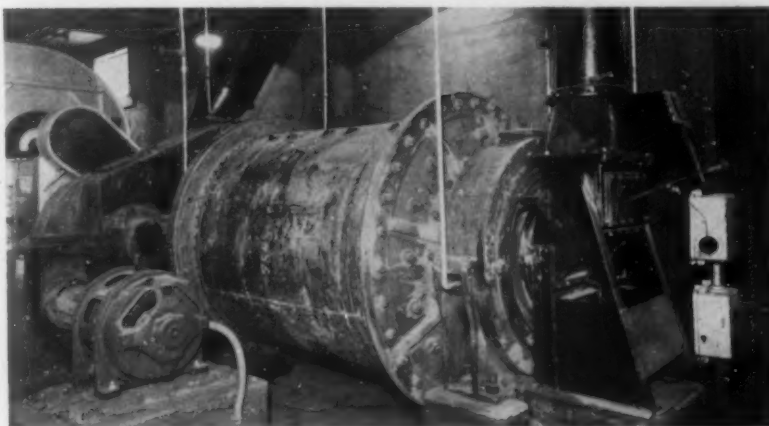
Small rotary compressors at points where compressed air is used have largely replaced central compressor plants

was undoubtedly the strongest argument in favor of the unit pulverizer. Later, when heat recuperators and grate clinker coolers were developed, the possibilities of more accurate control of the burning operation plus

this utilization of waste hot air for combustion led to the universal acceptance of the unit coal dryer and pulverizer.

While special types of coal pulverizers such as the B. & W., Raymond, Strong-Scott and Whiting mills have been very generally used for this purpose, recent installations have been made with air-swept ball or tube mills, and conical ball mills. The moisture originally contained in the coal goes into the kiln as steam or water vapor, and thus theoretically reduces the thermal efficiency of the kiln. Actually this is still an unknown factor. Some operators believe the presence of moisture or steam in the kiln in some catalytic manner aids in the clinker formation.

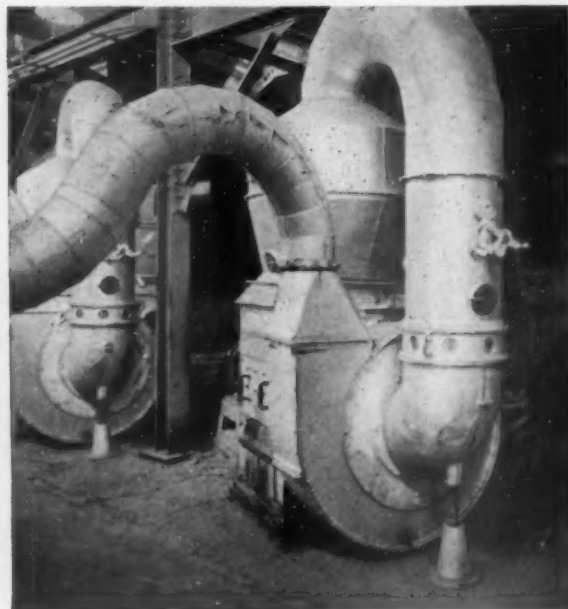
The use of unit coal dryers and pulverizers is no longer a trend. It is accepted as a necessary part of a modern cement plant. In this field the portland cement industry has made a notable contribution to all industry, for as one of the largest users of pulverized coal it has pioneered in the development of pulverizers and burners. The only development in this field that may take place in the future is the establishment of huge coal pulverizing plants at the coal mines and the delivery of pulverized coal to consumers through



Air-swept ball mills are used by one company for direct-firing kilns on the floor above



One of five types of unit coal dryers and pulverizers which have replaced central coal grinding plants. In this unit the primary air is held between 150 and 200 deg. F.



Four of the eight unit coal mills firing kilns in an eastern cement plant. Coal hoppers above are in a row with each over its mill. Burner pipe curvature is for more head room

pipe lines, as oil and natural gas are now delivered.

Finish Grinding

Fierce competition to market a special service cement in the buyers' market that followed the 1920's plant building splurge was probably the incentive which started the industry to grind the finished product finer and finer each successive year. Also,

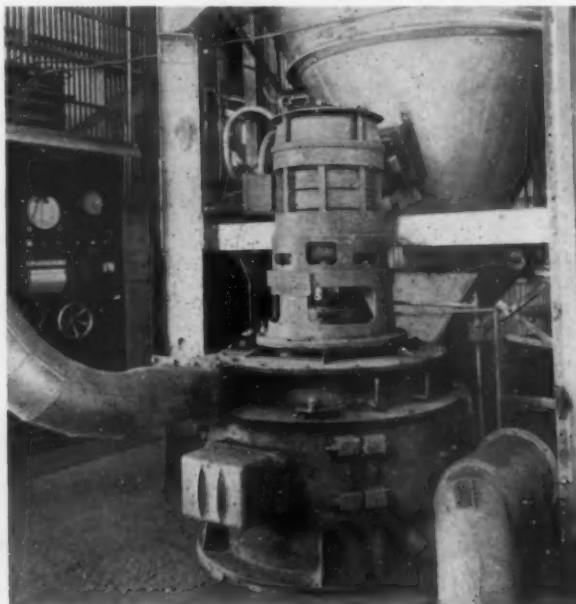
of course, for the first time in many years the industry began to feel the competition of foreign-made "quick-hardening" cements. At first it was thought that mere finer grinding was the answer, but it was found that the German quick-hardening portland cements were also higher in tri-calcium silicate, and that involved revision of the raw mix and harder burning as well as finer grinding.

Finer grinding of clinker led to larger compartment mills and more of them, if the capacity of the plant was to be kept up to its kiln capacity. Also this unbalancing of the plant led to more attention to grinding efficiency, which accounts for two notable steps in technical development. The first was the general adoption of air separators and the second

(Continued on page 66)



Direct-firing coal mill installation in a southern plant

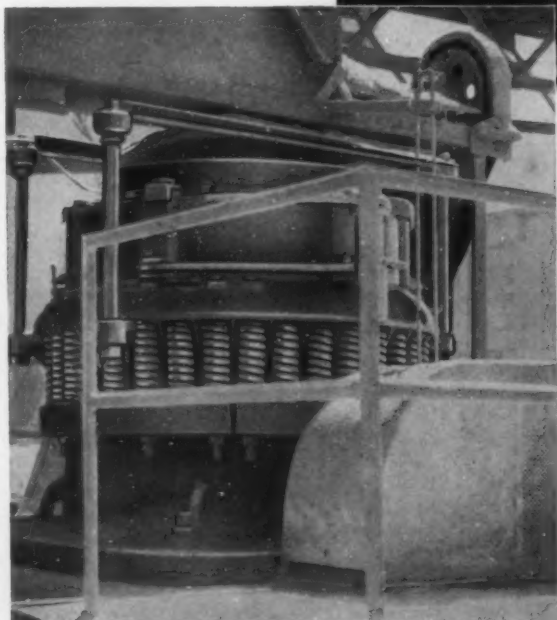
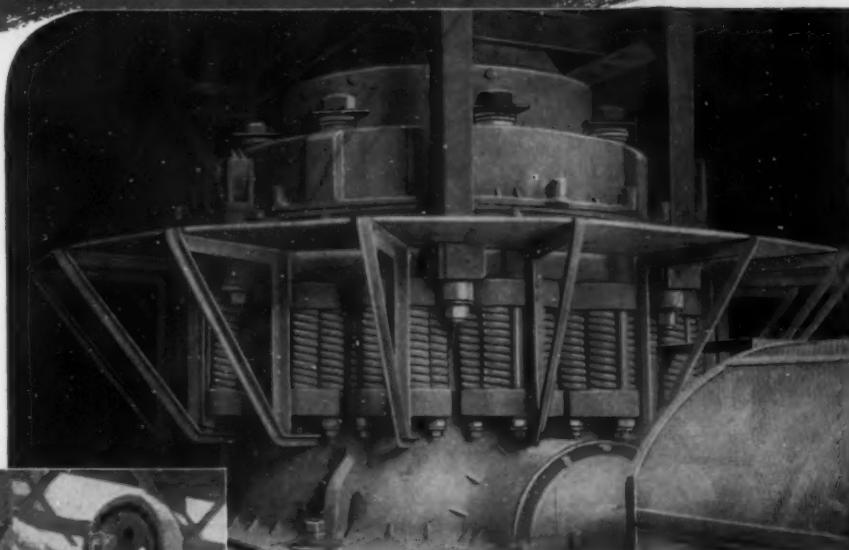


Installation of direct-firing coal mills in an eastern plant

Finer Crushing **AN** **IMPORTANT FACTOR IN** **CEMENT PRODUCTION**

Reducing 3½ to 6 inch limestone to minus ¾ inch ball mill feed with a 7-foot Symons Cone. ➡

Finer crushing of clinker, as is being done with this 4-foot Symons Cone, reduces the burden on the grinding mills. ⬇



Where crushing and grinding operations are involved, it is generally agreed that it is more economical to crush down to ¾ inch, or even finer, than it is to grind in a coarse mill. Whether it is a minus ¾ inch product for the raw side or crushing clinker to less than ½ inch, no other type of crusher can equal the Symons Cone for capacity or low cost operation. Crushing with Symons Cones reduces the overall cost of cement production, increases mill capacity, lessens maintenance and wear, and lowers the power load. If you are not using Cones now, investigate the advantages of this outstanding reduction crusher for the cement industry.



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Left: Bartlett Dam, with its multiple arches of concrete, in Arizona

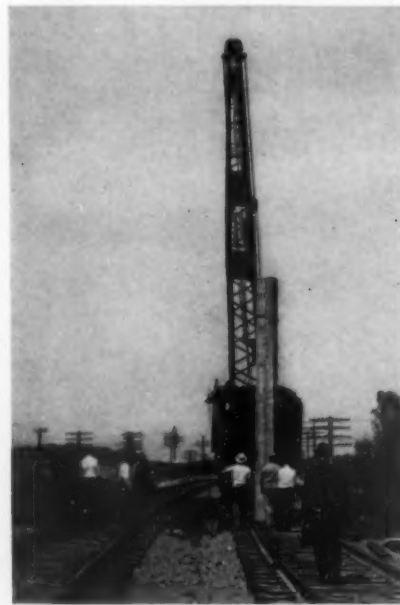


Large reinforced concrete water tanks at Rock Island, Ill. Similar tanks now being used



Above: Barn of concrete masonry; silos of concrete stave construction

Below: Bowman Airport, Louisville, Ky., has practically no reinforcing, except dowels at transverse expansion joints and tie bars across longitudinal center joint of each 20 ft. of construction



Concrete pile being placed for railroad trestle bridge



Combat cars en route to Fort Knox, Ky., to Fort



Huge, fire-safe concrete building, new navy fly

CONCRETE In The War

CONCRETE'S VERSATILITY as a construction material is a valuable asset to the war building program, which demands conservation of critical metals. New designs for concrete, with a minimum of steel reinforcing, and entirely new uses as a substitute for steel have been developed. Some of them will no doubt have their influence in postwar uses of cement and concrete.

New designs for concrete pavements, airport runways and streets, which require an absolute minimum of reinforcing steel or none at all, are now being used. Meeting all the structural requirements, these designs are being employed widely by the army and the navy in building access roads, airport runways and other "must" pavements.

Most of the steel in reinforced concrete pavements is distribution steel, which is used throughout concrete slabs to hold cracks together. Tie bars, deformed metal strips and dowels at the transverse joints are needed in much less volume. New designs have eliminated the distribution steel by shortening the distance between expansion joints to control the occurrence of cracks. The use of thickened edges, where needed, is a means of eliminating tie bars and dowels. Some of the new airport runways now under construction are of concrete with dowels and tie bars, the only steel used. In others, concrete upwards of a million square yards does not have as much as an ounce of steel in it.

Unreinforced concrete pavements, probably involving the use of more concrete to compensate for the absence of steel, will have just as long serviceability and as low maintenance

as reinforced slabs, in the opinion of many prominent authorities. It is essential that proper attention be given to preparation of the subgrades and embankments. In highway pavements this would mean a saving of about 40 tons of steel per mile.

Structural Concrete

Structural concrete design has also undergone changes. Concrete spans are replacing steel beams and trusses to a considerable extent, with a saving of about two-thirds in steel tonnage. Many of the unsupported spans are of unusual length, for concrete. Unreinforced concrete floors are being poured in many industrial plants, where new designs will permit. Culverts are being built of unreinforced concrete and the newer type igloos for ordnance plants are unreinforced. Concrete piles and planking are replacing the steel variety and unreinforced architectural concrete is a developing market.

Concrete Ships

Interest is again being revived in the construction of reinforced concrete cargo ships and barges. The Maritime Commission recently awarded a contract to McCloskey and Co., Philadelphia, for 24 self-propelled concrete ships of 5200 tons deadweight.

One of the largest current users of concrete and cement is the Tennessee Valley Authority, which is engaged in the largest construction program ever undertaken in the United States, to provide electric power for war industries. Completed and now under construction are 20 projects with a total volume of 12,210,100 cu. yd. of concrete.

being used for oil



en route on highway from Fort
Ky., to Fort Riley, Kans.

concrete building at one of the
new navy flying schools



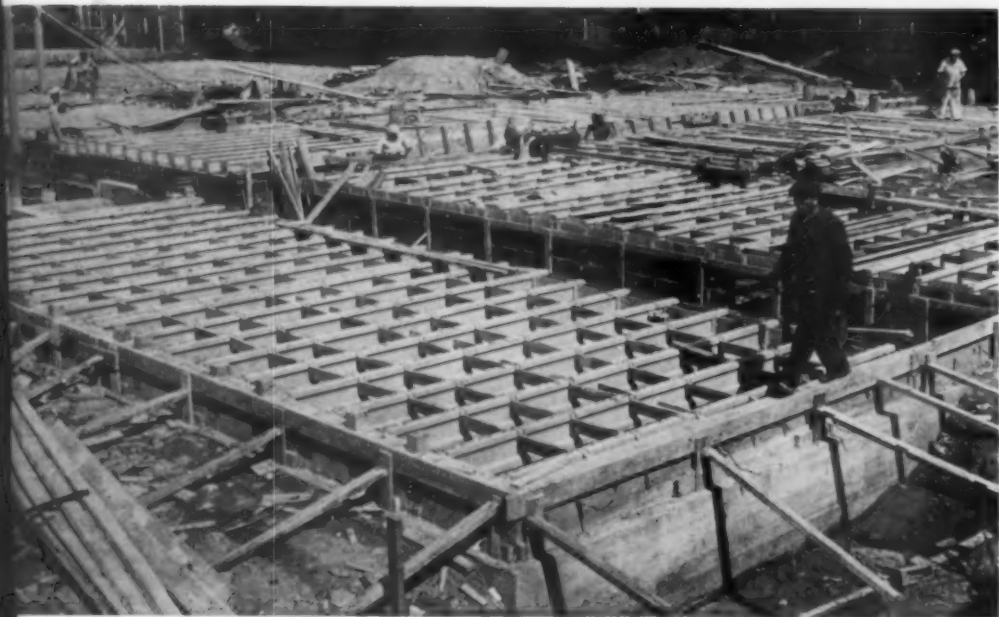
Navy training planes lined up on concrete apron
at a southern naval air station

Official U. S. Navy Photograph





Modernistic style concrete sanitarium structure



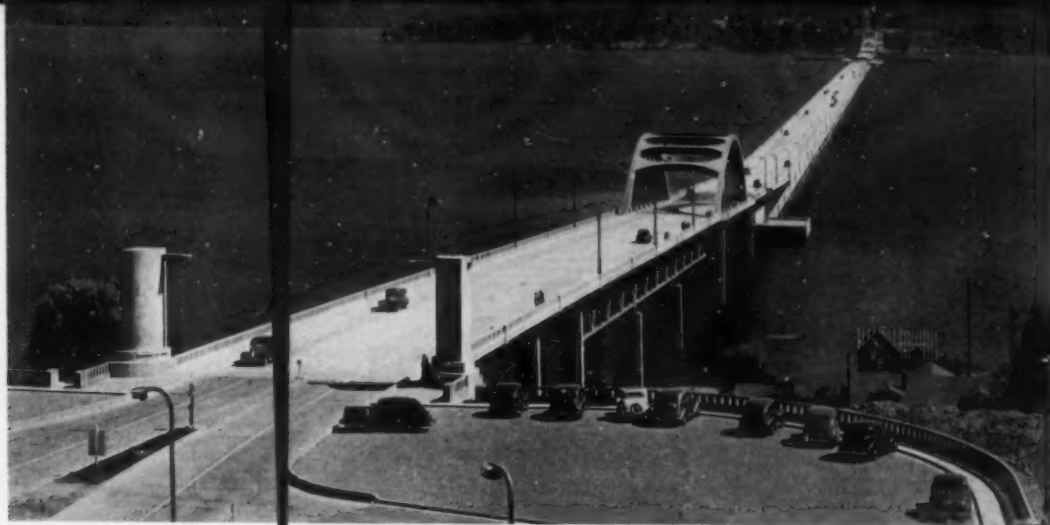
Above: More than two miles of precast concrete joists were used to support this two-story hospital

Below: Soil-cement road project in Illinois



Above: Large
bridge in
reinforced
Lake W
Se

Right: Ge
crete cau
prises 35
continuous
each 20



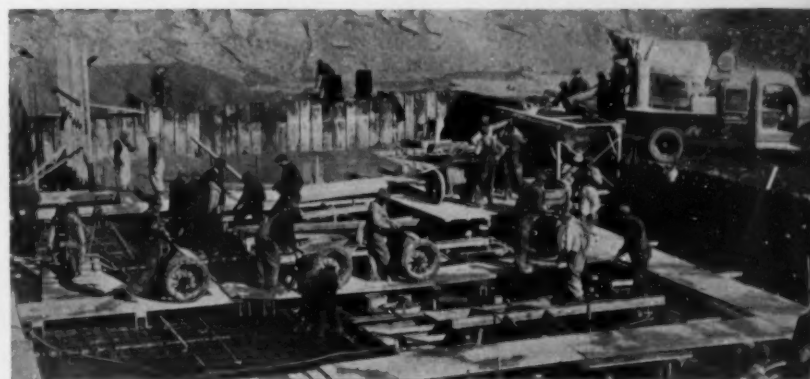
Above: Largest pontoon bridge in the world, of reinforced concrete, at Lake Washington, Seattle.



Right: Aircraft plant office is a fine example of architectural concrete



Right: Galveston concrete causeway comprises 39 three-span continuous girder units, each 201.5 ft. long

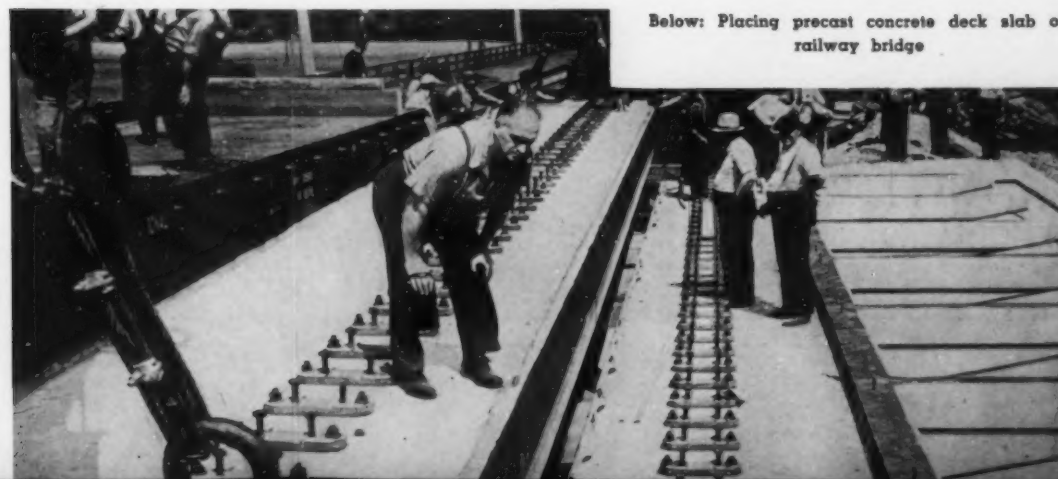


Placing concrete with transit mixer trucks at Chicago housing project

Right: Laying concrete water pipe to supply a southeastern Naval area with water, a F.W.A. project



Below: Placing precast concrete deck slab on railway bridge



GRINDING MILLS

GRANULATORS

BALLMILLS
KOMINUTERS

MULTI-
COMPARTMENT
MILLS

UNIDAN
UNI-KOM
TIRAX

PULVERIZERS

TUBEMILLS
ATOX MILLS

F. L. SMIDTH & CO.

60 EAST 42ND STREET

ENGINEERS

NEW YORK, N. Y.



Pictures show DEMPSTER-DUMPSTER picking up, carrying, and discharging a Detachable Body. Hoisting Unit Capacities: 4500 lbs. to 12,000 lbs. Detachable Body Sizes: 1½ cu. yds. to 10 cu. yds.



Drop-Bottom Type
Detachable Body



Tilt-Type
Detachable Body



Skip-Type
Detachable Body



Trash-Type
Detachable Body

DEMPSTER DUMPSTER

A Proven Way to Reduce Hauling Costs

The DEMPSTER-DUMPSTER consists of a hydraulic Hoisting Unit (which fits any truck chassis) and a variety of Detachable Bodies which fit any material hauling job.

The Hoisting Unit, hydraulically operated from the power take-off of the truck, picks up the loaded detachable body and places it on the truck chassis for transport. At destination, the hoisting unit discharges the detachable body automatically, or sets it on the ground, as desired. One man, who drives the truck and operates the DEMPSTER-DUMPSTER power controls from the driver's seat, is all the crew that is needed.

The Hoisting Units are built in a variety of sizes. The Detachable Bodies are built in a variety of designs and sizes to meet any material hauling requirement.

On the average material hauling job, one truck—equipped with DEMPSTER-DUMPSTER and five Detachable Bodies—will do the work of five trucks. The big savings in original investment, in operating costs, and in labor, are plainly evident.

Write for descriptive literature. Tell us about your particular material hauling problems. Our engineers will be glad to advise the proper DEMPSTER-DUMPSTER equipment to handle your job most economically. Dempster Brothers, Inc., 382 Shea St., Knoxville, Tenn.

DEMPSTER BROTHERS, INC.

Longest In This Hemisphere

Construction demonstrates
new welding techniques

By R. C. NEWHOUSE*

THE LARGEST ROTARY cement kiln in this hemisphere—a huge steel cylinder 11½ ft. in diameter and 475 ft. long—was recently shipped by Allis-Chalmers to the Des Moines, Iowa, plant of the Marquette Cement Man-

ufactured with buttstraps by means of rivets driven by hydraulic or pneumatic riveters.

However, all the advantages of welding were not realized until automatic welding and special fixtures for

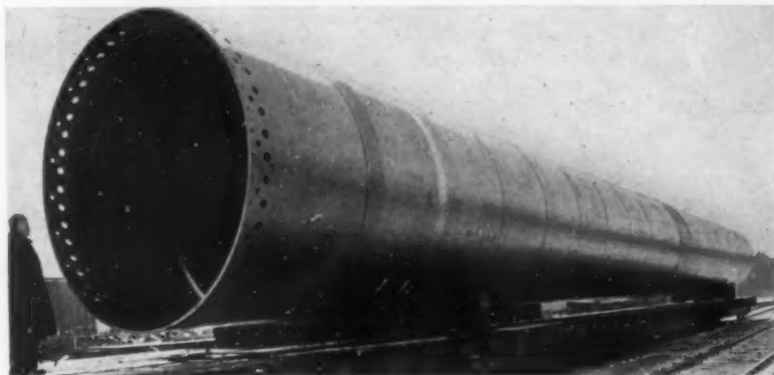


Fig. 1: One section of one of the largest rotary kilns ever built, 475 ft. long, requires three flat cars

ufacturing Co., where it will help to contribute thousands of barrels of cement for the war effort.

It is designed to operate at a speed up to 1.33 revolutions per minute and is mounted on seven 2-roller type supporting mechanisms. This shell will have a revolving weight of 1600 tons when loaded with refractory lining, heat transfer chains and the cement material which is being treated, and the kiln is driven by a 150-hp. motor through a double helical type gear reducer and totally enclosed, cut tooth main gear attached to the kiln shell.

More important than its immense size, or even its specific contribution to current war production, however, is the new welded design and construction technique which the big kiln demonstrates. Hand welding techniques were applied in the building of kilns and other cylindrical shells as long as ten years ago, replacing steel plate construction, where plates were

joined with buttstraps by means of rivets driven by hydraulic or pneumatic riveters. Such fixtures in Allis-Chalmers shops were responsible for the highly satisfactory completion of the new kiln.

In this 475-ft. kiln many engineering advantages of welded construction over riveted construction are appar-

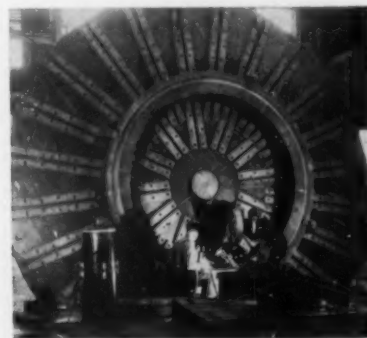


Fig. 4: Welding positioner used to hold rotary kiln riding rings rigidly in place during fabricating process

ent, and the operating superiority of the new type kiln is easily recognized. All of these design changes produce a more rigid construction with less weight, a more streamlined unit, and lower maintenance expense on kiln elements and lining.

Heavy solid plate construction at the riding ring courses was supplied with this kiln. The riding rings are of deep box section floating between rings welded to shell. This construction, originated by Allis-Chalmers, permits alternate heating and cooling of the shell without breaking rivets which is so common with the former construction.

The forged steel carrying roller shafts and heavy bearings are in proportion to give shaft bending stresses of less than 3,000 lbs. per sq. in. Also, the carrying rollers are narrower than the riding rings to prevent grooving. Thrust mechanism comprises

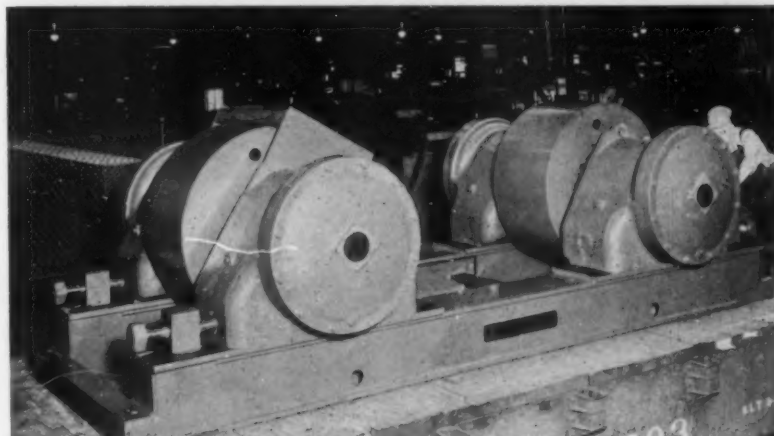


Fig. 2: Kiln carrying mechanism made with forged steel rollers and shaft

*Chief Engineer of Crushing and Cement Division, Allis-Chalmers Mfg. Co.



Fig. 5: Special discharge end section which prevents shell warpage

heavy mushroom type thrust rollers to carry full downhill thrust of kiln with beveled thrust surfaces to minimize wear.

All similar parts were made interchangeable. The bearings for carrying roller shafts are water cooled and flood oiled, with auxiliary oiling buckets which maintain lubrication in case external oiling supply fails.

Anti-slip bars are welded to interior of kiln shell to prevent slipping of refractories, while special air-cooled discharge end section prevents shell warpage even under conditions of high temperature of secondary air. For checking kiln operation, the kiln is equipped with sample holes.

Welding operations on the big kiln were not completed until the new unit had reached its operating location. Maximum permissible clearance made

it necessary to weld anti-distortion rings in the field where absolute rigidity of the shell was insured.

Progress Between Wars

(Continued from page 56)

to the use of grinding aids, of which the most important was TDA. It is noteworthy that the two dovetail together, as is illustrated by the description of grinding practice at the Permanente plant, elsewhere in this issue. To work most effectively the particles in an air separator must be dispersed.

Some of the early experience with air separators in connection with large compartment mills was not satisfactory. It was found that cement could be finely ground, as measured by the minus 200-mesh product, and yet not be good cement. There must be some of the very smallest micron sizes—the cement flour—and the air separator tended to remove all the finer particles before they reached this stage. The result was that in many instances the final compartment was left in open circuit. The introduction of air separators on the finish grind also led to more consideration of the gradation of particle size than had hitherto been given. Open-circuit grinding appears to give a proper gradation of sizes for best results automatically. Early air separator practice undoubtedly disturbed this natural gradation and accounted for some of the vagaries in the new cements.

Newer designs of air separators and provisions for manipulating their product, together with very large cir-

culating loads, which means more passages of the product through the mill, have largely overcome the early objections to air separators on the finish mills, although it is still contended the air-separated cement has to be ground finer on the whole than open-circuit ground cement.

With the general adoption of closed-circuit finish grinding with air separators, the need for long compartment mills ceased to exist, for the closed circuiting of air separators with the different compartments of a single mill was unwieldy and space consuming. The trend has been, therefore, back to ball mills as preliminary grinders and shorter tube mills for the final grinding.

TRENDS: It appears that the reversion to more and smaller grinding units will continue because more and more attention will be paid in the future to proper size gradation, and grinding practice will have to be adapted to produce a scientifically graded product. The measurement of specific surface area falls short in some respects of telling very much about actual size gradation. The requirement in the Merriman Board of Water Supply specification for a certain percentage retained on the 200-mesh undoubtedly had a logical reason, although perhaps 200-mesh is too coarse. Anyhow, what he was actually aiming for were properly graded sizes. The way some manufacturers met the specification by simply adding a proportion of coarse particles is not the answer.

Dust Collection

The first interest the portland cement industry showed in *dust recovery* was during World War No. 1, when it was discovered that stack dust carried away considerable percentages of potash. With imports of potash cut off, this offered the possibility of a valuable by-product. Only two or three plants succeeded in getting in dust-recovery installations before the end of war and then cheap imports cut out any profit there might have been in dust recovery for the potash alone, but manufacturers' eyes were opened to the large amounts of processed and partly processed material they were wasting. Even then dust-recovery installations were made rather slowly and generally only at the insistence of their neighbors. Even now few plants ever make "material balances" for their operations to see what percentage of the raw ma-

(Continued on page 94)



Fig. 3: Movable, easily-adjustable set-up for fabricating top of shell is arranged with special boom for kiln welding

SLY DUST CONTROL

SALES AND ENGINEERING DATA

SLY AUTOMATIC-CONTINUOUS DUST FILTERS

No. 68 Type 360 Sly Dust Filter
for AUTOMATIC-CONTINUOUS Operation.
This Sly Dust Filter is in
use in the "Finish Mill" of
a cement plant, for control-
ling the dust from -
a Feed Bin
a Tube Mill
a F.K. Pump Hopper
an Elevator
a Fines Conveyor
a Tailings Conveyor
Uninterrupted
24-hour-per-day
operation -
automatic.



- The above photograph shows the following equipment and features:
- (1) Cloth bag Dust Filter with motor shaker drive at each end
 - (2) Access door to inside of filter
 - (3) Two dust hoppers with continuous discharge valves
 - (4) Motor drive with sprockets and chain for continuous valves
 - (5) Dust spouts for continuous return of dust to flow of material
 - (6) Clean air ducts with motor operated dampers for alternately shutting off one or the other dust filter section
 - (7) Safety relief door
 - (8) Clean air pipe to exhaust fan inside of building
 - (9) Standard support with walkway and railing around dust filter

The clean air duct with dampers may be attached to side or top of filter.

THE W. W. SLY MANUFACTURING CO.
CLEVELAND, OHIO

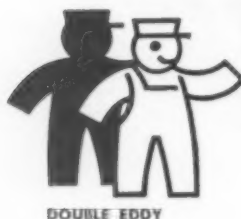
DATE Nov. 12, 1941

NO. 82-L

More than 5,000 Sly Dust Control
installations in successful operation.

★ In the rock products field many processes requiring dust control are continuous. For these conditions the Sly Automatic Continuous Dust Filter is highly satisfactory. ★ The data sheet (above), showing an installation for a large cement plant, gives some features of the equipment. If you will write us fully about your conditions, we shall be glad to tell you exactly what can be accomplished.

THE W. W. SLY MFG. CO. • 4746 TRAIN AVENUE, CLEVELAND, OHIO



Camera catches "Double Eddy" IN ACTION...

THE INSIDE STORY OF BUELL'S HIGH EFFICIENCY

Buell Dust Recovery Systems are head and shoulders above all others in the rock products field—and the diagram and photograph at the right show why. Here, a full-size Buell (van Tongeren) cyclone, constructed of transparent plastic, has enabled the camera to catch the dust movement inside under actual operating conditions.

The existence of the "double eddy current" (present in all cyclones) is proved by the two separate flow paths of the dust within the collector. One stream (light arrows) follows a downward path; the other (dark arrows), consisting principally of the finer particles, has a spiral motion upward. In the ordinary cyclone, this upward movement reduces efficiency by encouraging re-entrainment of dust already separated, and by forcing a large proportion of separated dust up under the top plate.

But note how simply the ingenious van Tongeren design (exclusive with Buell) eliminates these disadvantages and *actually utilizes the energy of the double eddy current to increase collection efficiency!* As the fine dust (dark arrows) moves upward, it is caught by the patented "shave-off" and by-passed down to the lower part of the cyclone where the downward flow of the double eddy current carries it to the discharge.

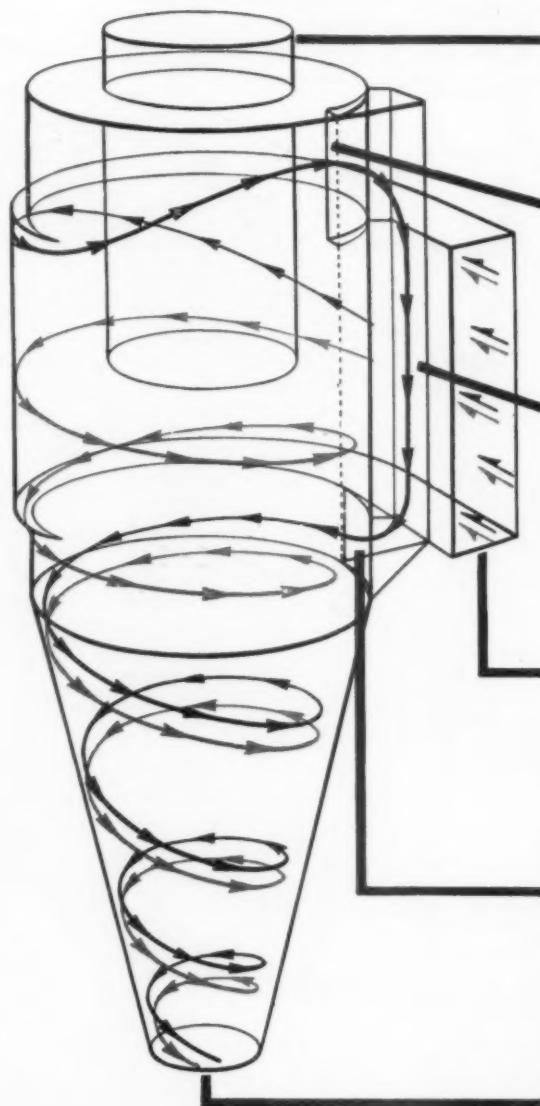
Buell Dust Recovery Systems are thus able to offer extra collection efficiency, particularly in the important particle size range from 0 to 43 microns, with no corresponding increase in power consumption, or draft loss—a definite "plus" advantage no other mechanical collector can offer.

Furthermore, this high efficiency is achieved without resort to small-diameter cyclones—and Buell's large-diameter cyclones reduce abrasive action, permit construction of heavier ($\frac{3}{8}$ ") metal for extra long life, and will not clog.

BUELL ENGINEERING COMPANY, Inc.

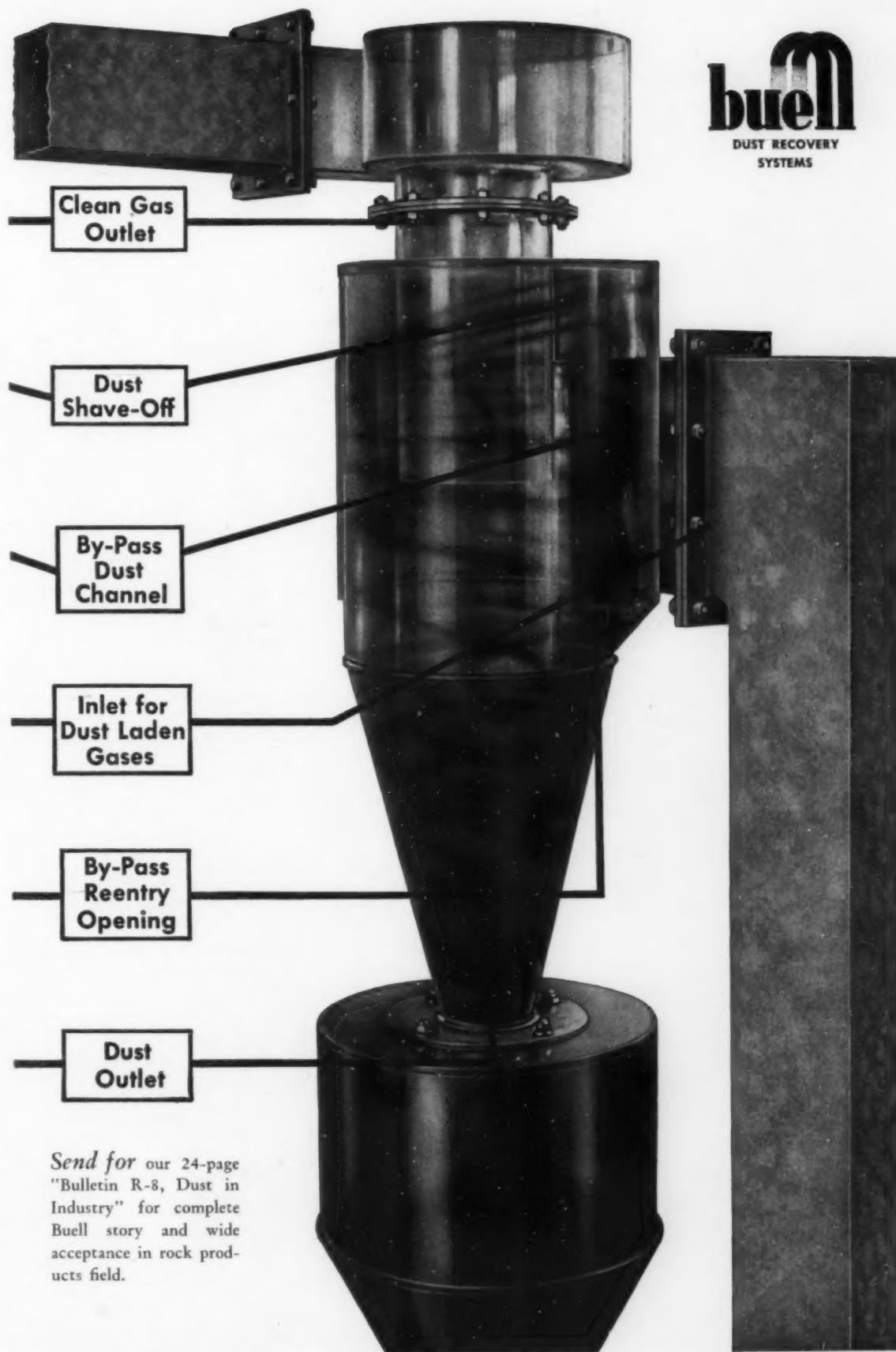
Suite 5000, 2 Cedar Street, New York

Sales Representatives in Principal Cities



←←← Pattern of dust stream (principally the finer particles) following upper half of double eddy current.

←←← Pattern of dust stream following path of lower half of double eddy current.



Send for our 24-page
"Bulletin R-8, Dust in
Industry" for complete
Buell story and wide
acceptance in rock prod-
ucts field.

Operating Plant At High Capacity

How cement manufacturers are meeting the problem of operation at high capacity with minimum replacements

By NATHAN C. ROCKWOOD

IT OCCURRED to us that operating men in the portland cement industry must be learning a heck of a lot about weak parts in cement-mill machinery and equipment, now that repair and replacement parts are getting harder to obtain. We thought they might give the engineers, researchers and inventors employed by machinery manufacturers something specific to work on that would make for better service from their machinery in the happier days to come.

The idea was stimulated by reading an article in a British contemporary on "War-time operation and maintenance of American 'caterpillar' tractors." You see the Britishers are more thorough in some respects than we Americans, and instead of merely replacing a broken or worn-out part, they proceed to try to find out how to improve the design or the device so it won't break so readily or not at all. We thought maybe cement plant operators would have suggestions of a similar nature based, not as the British on a year or two's experience, but on many years' experience.

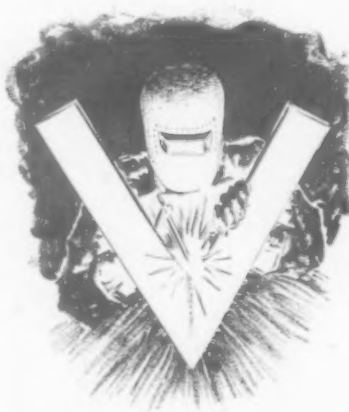
American machinery manufacturers probably will learn a great deal about the weaknesses of their equipment as a result of our supplying "lease-lend" allies with such equipment. It appears that we have become so accustomed to replacements on account of obsolescence that relative freedom from repair and replacement has perhaps not been so urgent a goal as in foreign countries which have had to conserve materials far more than we have. Probably American machinery is in most respects the best in the world, but nevertheless it is possible that when the war is over foreign competitors of American ma-

chinery manufacturers will have learned to make some parts of it better.

Ideas from Cement Plant Operators

The foregoing digression is by way of introduction to returns from cement-plant operators on how they thought other operators and machinery manufacturers might use and make machinery that would require less maintenance. We are very grateful to a number who supplied us with suggestions. Probably it is too early for most plant operators to have felt any real pinch in obtaining repair and replacement parts, and they certainly have other more urgent business in these days than "writing to the editor."

It is intended that this summary



X-raying a weld on a kiln shell, using a 220,000-volt x-ray unit

will be of practical value to the machinery manufacturer in helping him to design still better machines. It is not intended to deprive him of repair and replacement part business, for the better he designs his machinery and its details, and the better the quality of their structural material, the more likely he is to get all the repair and replacement business. And, most important of all, the better prepared he will be to meet post-war competition, which, according to our present economic planners, will have to be on a free-trade, or near free-trade basis.

Structural Failure of Compartment Mills

A general superintendent reports:

"A few years ago a large compartment finish mill of conventional design cracked over half way around the shell between the second and third compartments. The crack was V'ed out and welded. New plates were prepared and welded to the shell. These new welded plates just filled the spaces between the existing butt straps, so that the mill had a double shell over the repaired section. About two months later a similar compartment mill broke in the same manner, and was repaired in the same manner. Both mills had been in operation about ten years prior to the development of these major cracks.

"With both mills having a double shell in their central sections, equal to about half the length of the mill,

(Continued on page 74)



HELTZEL BULK CEMENT HANDLING EQUIPMENT

Is being used on the most vital concrete construction projects. Standard equipment, designed for efficiency—speed in operation and fast assembly includes the following units:

Bolted type circular tanks for storage and truck or car loading—from 600 to 1500 bbls capacity.

Bolted type circular tanks for use as recirculators to increase the capacity of batching plants such as combination aggregate bins, etc. from 300 to 1500 bbls. capacity.

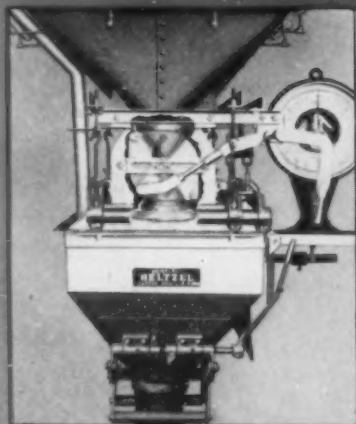
Portable bulk cement batching bins 100 or 200 bbls. capacity which can be provided with a portable recirculating tank to provide capacities to 575 bbls. Both units shipped completely assembled.

Semi-portable bulk cement batching bins 300 or 400 bbls. capacity, which can be provided with a portable recirculating tank to increase the capacity to a maximum of 800 bbls.

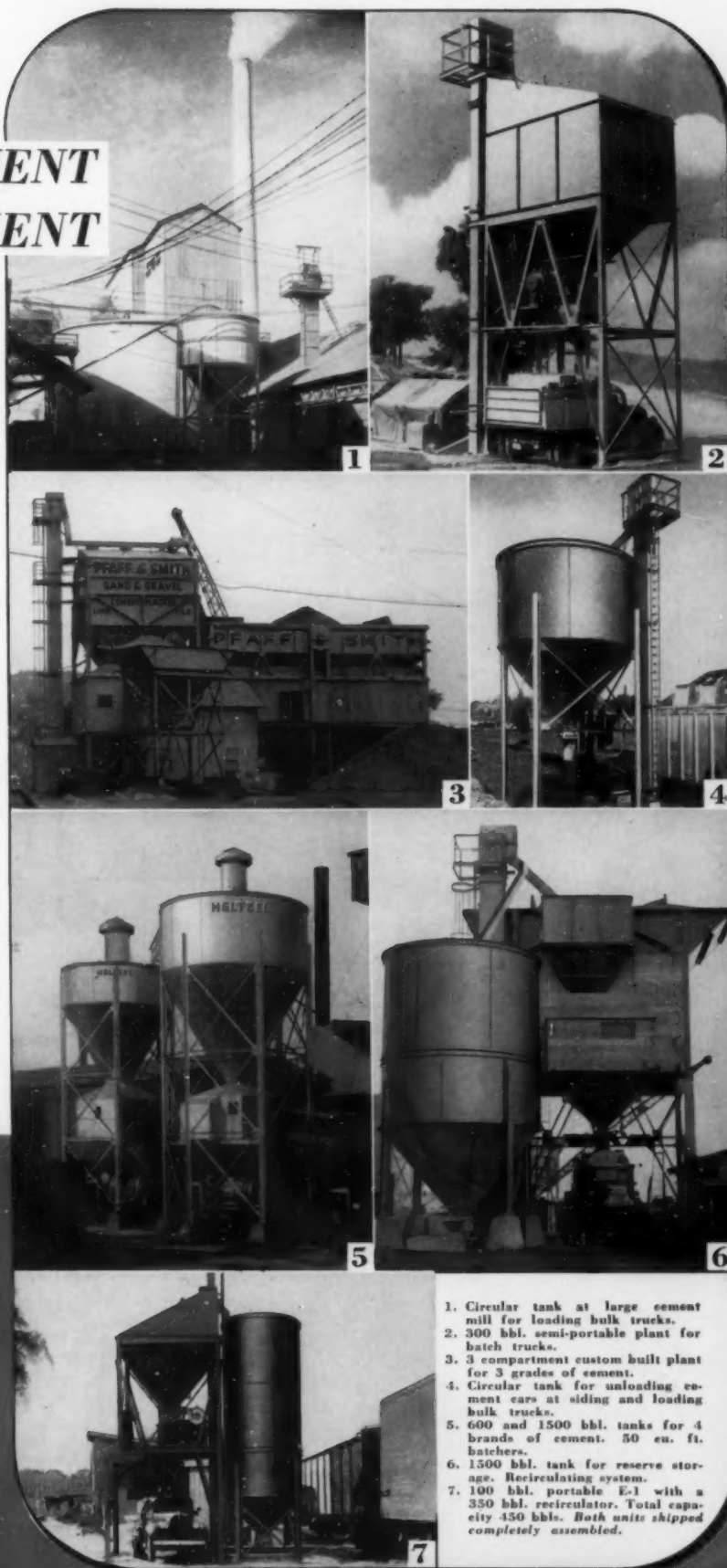
Custom built plants with multi compartments for several grades of cement.

Elevators, screw conveyors, air veyor systems available to suit specific conditions.

Write for complete information, specifications, etc.



Cutaway view of Heltzel bulk cement batcher illustrating the rubber tubular valve for controlling the flow of cement from the bin into the batcher. All Heltzel bulk cement bins are provided with this valve.



1. Circular tank at large cement mill for loading bulk trucks.
2. 300 bbl. semi-portable plant for batch trucks.
3. 3 compartment custom built plant for 3 grades of cement.
4. Circular tank for unloading cement cars at siding and loading bulk trucks.
5. 600 and 1500 bbl. tanks for 4 brands of cement. 50 cu. ft. batchers.
6. 1500 bbl. tank for reserve storage. Recirculating system.
7. 100 bbl. portable E-1 with a 350 bbl. recirculator. Total capacity 450 bbls. Both units shipped completely assembled.

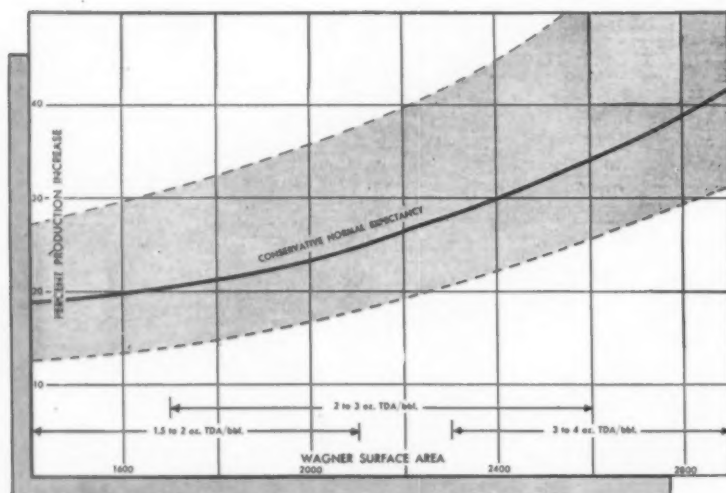
HELTZEL

STEEL FORM & IRON CO.
WARREN, OHIO • U. S. A.

FOR "all-out" PRODUCTION THE SUCCESS OF TDA

INCREASES PRODUCTION ★ ★

SAVES POWER . . . SAVES VITAL
while improving the quality of



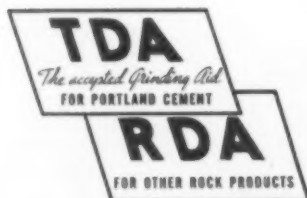
The graph shows TDA performance range, based on mill conditions and on adding TDA at the proper stage of grinding operations. This is a sample of what TDA has accomplished for others. Why not try it for yourself?

Now, more than ever before, many cement plant executives and engineers must utilize existing plant facilities to the limit and make every effort to increase output. To save power and at the same time increase production, more and more cement plants throughout the country are finding invaluable assistance in TDA, the accepted grinding aid for Portland cement.

"All-out" effort and "all-out" production demand everything we've got, and nothing less than the best we can do will serve to meet today's needs. With

TDA, you step up production, you save power, and you conserve your steel grinding media, thereby getting the utmost out of your existing equipment.

An improved product, plus a saving in power and steel, has been the result of the adoption of TDA in many cement mills, and more than sixty plants have found in it an answer to many of their production problems. To date, over 60,000,000 barrels of cement have been ground with TDA, and in more than six years not a single user



DEWEY AND ALMY CHEMICAL
CHICAGO CAMBRIDGE

IN OVER 60 PLANTS

OFFERS ONE ANSWER

STEEL GRINDING MEDIA the finished product...

has given it up. Experience has proved its usefulness and worth.

TDA is the accepted grinding aid for Portland cement, a powerful catalyst-dispersing agent. You can count on it to give help where it is needed. Its record of successes with more than sixty producers suggests its ability to do something to solve your production problems, though we don't claim that it's a cure-all for every headache in the cement business. Our engineers will be glad to go over your plant facilities and make suggestions as to what results you can expect to get from TDA. Ask us about it — today.

COMPANY
OAKLAND

FOR DRY PROCESS RAW GRINDING

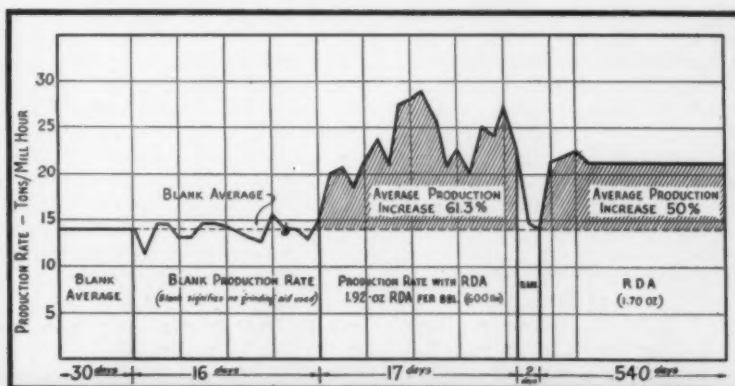
RDA

In the grinding of rock products, RDA as a grinding aid offers a means of conserving power and increasing output. It was developed to meet the needs of the raw grind where the catalytic action of TDA is not necessary.

RDA permits balanced plant operation, increases grindability, helps eliminate dusting (hence reducing stack losses from the kiln), and gives more desirable particle distribution. Furthermore, air separator efficiency is increased.

Like TDA, RDA is not by any means a cure-all. We know that it has had many successes in actual use in different cement and other rock products plants all over the country, and it has shown production increases ranging from 15% to 90%. While RDA may not do as much for your product, isn't it worth a trial? It takes no expensive equipment.

Here's what one mill is getting with RDA. Notice the marked increase in production after RDA was added and the sharp decrease when RDA was stopped. By using only 1.7 oz. of RDA solids per 600 lbs. of raw material, production was stepped up 50%.



(Continued from page 70)

it was felt that lasting repairs had been accomplished. This, however, was not to be the case, for recently one of the mills has again broken near the original repair, and this time the cracks have formed not only in the original mill shell, but in the new plates welded to it. Another welding job has been effected, and the mill is running, but it is apparent that a type of repair more fundamental than continually welding up cracks will be required to keep these mills from breaking in two.

"Inquiries made of other operators, who have similar large compartment mills, have revealed that cracking of such mills is occurring all too frequently. Lasting repairs, in some instances, have been made by installing riding rings near the centers of the mills. These rings are supported by rolls which carry the load at the central point of the mills. In some cases the rolls rest on a rigid foundation, and in other cases spring supports are provided for the roll foundations. This procedure would appear to be the most advisable, because it provides a constant amount of support at the rolls, regardless of factors such as wear of trunnion bearings and warping of the mill shell, due to temperature effects. In other instances repairs have been made by welding bars to the mill shell, parallel to its axis.

"While repairs such as those described above have served to keep these large mills in operation, it is apparent that the basic design of such mills has been at fault. Maybe the answer is that long, heavy tube mills, supported only by end trunnions, are not practicable. In any case, it is the purpose of this article to direct attention to this subject, so that those having knowledge of the best means of repairing such mills will make it available to others, and also that equipment manufacturers may make a critical re-examination of their designs of large tube mills, paying particular attention to the fatigue of metals resulting from stress reversals such as occur many millions of times in the life of a tube mill shell."

Careful Inspection

A general manager:

"Early last year we ordered new shells for our raw grinding mills because in spite of grout and zinc between liners, the old shells were showing pretty heavy scour from the slurry. We installed one new shell

this March and the other just reached us and will be installed as quickly as possible. These replacements are of course to take care of slow wear over a period of 14 years. The only breakage we have had of any consequence was the cracking of the web and the face of a kiln carrying roll, which we had to remove and weld.

"We have stressed close inspection and careful adjustment of all machinery and have of course given much attention to the maintenance of safe stocks of parts and operating supplies under the various limitation orders of the OPM and the WPB. We ran over the allowances of order P-100 rather heavily last year both in purchases and use but we reported this to the WPB, asking and receiving their approval and being given a reasonable allowance for the current quarter."

Speed of Compartment Mills

A superintendent:

"Our experience in corresponding with manufacturers of grinding mills, is that no two of them agree on mill speeds, ball loads or ball sizes for preliminary and final grinding. It is desirable that further research work be done on this to establish the best operating practice.

"The compartment mills at one of our plants were equipped with sling type or 'cradle' feeders. These feeders were not positive enough, as the amount fed would vary greatly due to variations in the size of the clinker handled. There was no way of gauging the amount of clinker being fed. We have corrected this condition by installing constant-weight belt feeders, and obtained a substantial improvement in mill capacity."

Need of Better Kiln Refractories

The same superintendent:

"Kiln lining refractories at all our plants cause us some annoyance. We have gone over to magnesite brick for the burning zone of two of the plants. These are substantially more expensive in first cost, but the longer life is sufficient to wipe out this discrepancy.

"We hope the refractory brick manufacturers will continue research on kiln lining refractories. It would be fine if they could develop a refractory as superior to magnesite as magnesite is to the high alumina brick, but without too much further cost increase.

"Most of our lining failures start on the butt-straps of the kilns, where

the rivets are, as this is the place where the kiln shell first shows red. We have no welded kilns, but would expect kiln lining experience in such kilns should be much better. We are now experimenting in the back zone of our kilns in an attempt to prolong the life of the brick over the rivets. In a section where we normally use silica brick, we have continued the silica brick except over the riveted portions, where we put in high alumina brick. This experiment has not yet continued long enough to tell if the results are favorable."

Welding Most Important Maintenance Aid

A general superintendent:

"As to a few of the things we have learned in the maintenance of machinery, due to our inability to get spare parts formerly used, as well as improved practices we have gone to, I will say that they are too numerous to mention and we cannot do justice to them in one letter. However, one thing which I think would interest you most is our resorting to the electric welding method of repairing machinery.

"Our welding machine has been pretty nearly worth 'its weight in gold' to us for the past few years in the way of getting production through which otherwise would have been lost, due to slower methods of repairing machinery formerly used before electric welding came into common practice. In addition to this it is generally much cheaper to repair with the electric welder.

"The job which the writer has in mind which the welder saved us the most money on, was our hopper for our large crusher. This hopper is constructed of 1-in. steel plate heavily reinforced on the under side. The abrasion of the stone wore this 1-in. plate through, and while half the hopper was practically as good as new, the remaining half where the rock passed over was worn out. We resorted to the electric welding of 1-in. x 6-in. bars on the worn surfaces of this hopper three years ago. Since that time we have added each year another layer of 1- x 6-in. bars, and so far have been able to postpone the installation of a new steel hopper, which at the present time would be very hard to get, due to scarcity of steel plate."

Another superintendent:

"We are operating along a plan practiced for years. We have im-

(Continued on page 95)

MORE STAYING POWER

ON PUMPING JOBS

The extra protection of
TRI-CLAD MOTORS
helps keep pumps delivering

NOW—before you buy motors—is the time to solve your pump-motor problems. Wherever continuous pumping is essential to your production—wherever pumps must operate under adverse conditions—your motors must be secure against 1) physical damage, 2) electrical breakdown, 3) operating wear and tear.

Here's where the *extra*-protection features of Tri-Clad motors will help you get the triple-shift operation you need. Their cast-iron frames and end shields exclude falling objects and dripping liquids; their windings, of Formex wire, are resistant to oil, moisture, and heat shock; their improved bearings, completely sealed in cast iron, are protected against the entry of dust and dirt. All these features add up to *extra staying power* on jobs where 24-hour production is essential.

How to Get Motors Quicker

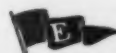
USE STANDARD MOTORS. Wherever possible, select standard, open, sleeve-bearing motors. Building fewer "specials" means faster and greater production of motors for war work.

PLACE ORDERS EARLY. Order the motors when you order, or plan for, the equipment they are to drive.

SEND PROPER PRIORITY. Be sure correct priority papers accompany your order and that the priority rating reflects the urgency of the motor's use in the war.

CHECK G.E. for warehouse stocks. A supply of many standard motors are kept on hand to meet urgent war needs. Perhaps the motor you want, or can use with a few simple changes, is available for immediate shipment.

General Electric, Schenectady, N. Y.



General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

Triple-shift operation is an old story to this Tri-Clad motor driving a coolant pump. Tri-Clad motors are now available up to 100 hp in standard, open construction, and in a wide range of other types and ratings.

Protected. Dirt and dripping liquids are ever-present enemies of motor operation in locations like this. But the smoothly contoured, cast iron frame of this Tri-Clad motor guards it against damage.

Long Lasting. This Tri-Clad motor is an excellent running mate for the chlorinating pump it drives. Its extra-protection features—cast iron frame, windings of Formex wire, improved bearings—are assurance of long life on important jobs.

BUILT FOR PROTECTION FIRST... TO LAST

GENERAL ELECTRIC

760-107-8000

War Brings New Problems to the Cement Industry

New workers, older men in new jobs, and heavy production call for more intensive safety activity

By R. A. DITTMAR†

THE HUMAN BEING is a mixture of instincts, emotions and tendencies. The individual varies in the proportion of these human ingredients of which he is composed. It is necessary that the foreman understand human beings in order to influence men's actions along safe courses. A strong appeal, therefore, to man's inherited instincts cannot be overlooked in the safety program.

We should teach our foremen and supervisors to appeal to the man's instinctive pride in accomplishment. We should point out that portland cement, the product of our industry, has made possible our good roads, dams, bridges and skyscrapers; that it has built safety and beauty into our surroundings; that it has brought happiness and comfort into our homes; that cement is one of the important building materials that has promoted world progress; and we should emphasize the fact that today this same magic power is essential to our war effort in the construction of more and better military highways, fortifications, airports, ammunition dumps, canals and munitions factories. Cement is an essential and is fast becoming a critical material in the war effort, and the men in the cement industry can be proud of the fact that they are furnishing an element vital to the promotion of America's total war.

We are not asking for special privileges or profits; only for an opportunity to work and produce, with any sacrifice we may be called on to make. Our plants give us our means of help-

ing; our safety program gives us our means of conserving our man-power for this all-out effort. Pride in accomplishment is only satisfied when our workers know that other people recognize and appreciate such facts.

At Hudson the importance of cement and the part our industry is taking in this war effort is brought out in our safety paper and repeated at mass meetings and foremen's meetings. Now, it is every worker's patriotic duty to avoid personal injuries.

Our foremen and supervisors should be taught to appeal to a man's natural desire for recognition. Acknowledgement of faithful service, or a job well done, is most essential for maintaining interest and enthusiasm. Recognition of interest taken in the accident prevention program, and of the employee's safety suggestions should not be overlooked. Half of the joy in life lies in a man's knowledge that he is appreciated, and even a friendly nod on the job is important.

The foreman should understand ways and means of arousing the competitive instinct in the safety program by posting departmental accident experience records and by putting on safety drives. There is practically no limit to the benefits that may be effectively achieved by arousing the spirit of competition among our workers. A keen competitive spirit should be featured as a means of developing safety interest. Man's social instinct helps make team-work a pleasure to him. Once a group of men becomes inspired with a common ambition, the group is carried on by team spirit and loyalty to a cause. Once the foreman is able to arouse the team spirit in a group, the group will go far to set up new records of accomplishment not otherwise obtainable.



R. A. Dittmar

Let us not overlook the fact, too, that people crave an opportunity to be loyal to someone, or to some cause. Every worker has a natural urge to be loyal to his foreman, to his company, and to the product he is helping to make. The foremen and supervisors can appeal to this loyalty by actions that reflect sincerity and an interest in the individual. Successful human relations are based on mutual confidence. The foreman who does not win the loyalty of his workers has himself to blame more than any other single factor.

Our foremen's responsibilities are being increased as the result of the present labor turnover. Many new employees are coming into our plants and the safeguarding of these new folks is putting an added load on our safety organizations. We cannot afford to have an increase in our accident experience that indicates lack of knowledge or skill, or that indicates faulty human behavior. Now, more than ever, we must help our foremen and our safety organizations to guard the lives and bodies of our workers. We can all be leaders in our safety program; we can boost for safety and we can set a good example. Our behavior on the job and at home should reflect a whole-hearted, enthusiastic interest in our own well-being and that of our fellow workers and our families—enthusiasm is contagious.

Today war production is America's No. 1 job, and every facility of American industry is being pushed and expanded for its promotion. For the stepping up of war production

(Continued on page 95)

*Extracts from an address on "Supervisory Training to Meet Present and Prospective Needs" at the general session for Safety, Spring Meeting, Portland Cement Association, at New York City, May 19, 1942.

†Superintendent, Hudson, N. Y., plant, Universal Atlas Cement Co.

Evaluating High Initial Strength

Complications in the manufacture of portland cement caused by demands for special brands. Increase kiln length to lower costs

By ALTON J. BLANK*

BACK IN THE "TWENTIES," the cement industry seemed to be doing very well by itself. Competition, as a result of a considerable number of new cement plants being built here and there, stiffened somewhat. Cement salesmen gradually overstepped the bounds within which they had previously operated, and bragging on, claiming for, and promised as concerns the respective brands of cement they represented. Gradually came the day when plant operators, inch by inch, were forced to change their ways and attempt to make products which would correspond whole or in part with the extravagant claims and promises that had been made by salesmen for their products. To promise was easy, but to fulfill was more difficult. The salesman was not out of pocket, nor lost face with his company, in promising the trade that the brand of cement he represented was the best on the market as concerns early strength, permanence, and one thing and another. Up to the present time it would appear that cement salesmen do not have a very definite knowledge, nor have been sufficiently

*Executive Vice-President in Charge of Operations, Cementos Atoyac, S. A., Puebla, Pue., Mexico. Also Chemical Director, Cement Process Corporation.

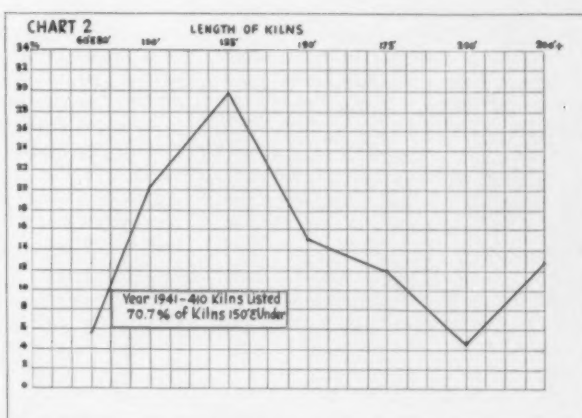
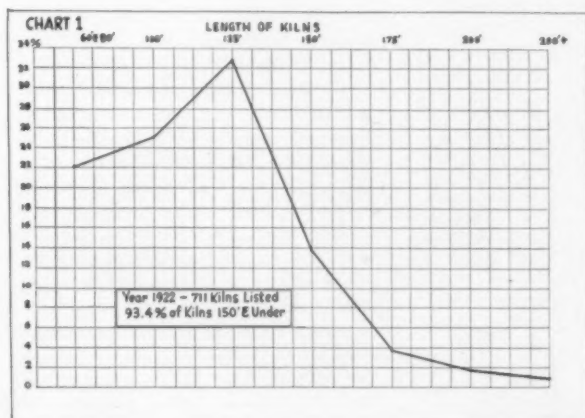
well educated as to the meaning of the word "permanence." A tour, for example, of the ancient constructions in Mexico, might enlighten them somewhat. Pyramids, dwellings and roads constructed hundreds and possibly thousands of years ago in the states of Yucatan, Mexico, Puebla and Oaxaca, are still standing notwithstanding the fact that inferior labor and materials of construction were used in their building. In the light of such crude and ancient constructions, now standing, the cement salesman must survey with considerable dismay a number of portland cement concrete structures, in which his cement has been used, but which after only a few years since placement, are disintegrating, some slowly, others at an accelerated rate, the reasons for which he is unable to explain.

Salesmen Ask for More Brands

The cement salesman, in promising the trade cements of increasingly high initial strength, has based his sales arguments accordingly to the effect that initial high strength in a cement denotes quality. He has not

bothered to ascertain from the operating department whether these cements of initial high strength, yield permanent concrete.

The cement chemist, in attempting to meet the promises of his company's salesman, has found it necessary to grind his raw materials finer, increase the lime content, burn the mixture harder in the kiln, and grind the resulting clinker to a higher degree of fineness, or surface area. This procedure has resulted in increased costs of production since a greater consumption of power and fuel was the immediate result. Into this breach stepped the economist or statistician, with the object of offsetting these increased costs of production, and to their aid came the manufacturers of cement machinery, who had the answer for everything. As a result, new and more efficient kinds of machinery were designed to offset the increase in production costs which resulted from the new and easy form of salesmanship developed by the cement salesman. These new types of machinery involved a considerable investment for cement concerns that had up to then been getting along nicely with their older equipment. Where mills 6 to 7 ft. in diameter and



Left: Trend in length of kilns in 1922. Right: Change in trend to the longer kiln in 1941

up to 30-ft. in length were standard cement mill equipment twenty years ago, newly designed mills 8 to 10 ft. in diameter by as much as 50 ft. in length were declared modern and made their appearance. Where kilns 8 and 10 ft. in diameter by 125 to 150 ft. in length were very satisfactory twenty years ago, kilns now installed up to 14 ft. in diameter with lengths approaching 500 ft. are considered the solution from the fuel economy standpoint. Yet, cements produced the new way, some of which are showing a very unsatisfactory performance after only a few years use, can trace much of the result of this performance to salesmanship in the recent past.

Go to Longer Kilns for Fuel Economy

In order that fuel economy could still be maintained, the solution was larger and longer kilns, which permitted of the burning of higher lime content raw mixtures to a greater degree of hardness. It was also proved that quick air cooling of clinker helped the initial soundness of the clinker, and the autoclave test was brought forward to assist in proving this. The object, of course, was a cement with high initial strength and apparent initial soundness. Such things as latter day strength, and the cement's permanence in concrete, seemed to have been lost sight of.

Thus, to produce high strength cements in the long kilns, less fuel was required than in the production of cements of ordinary composition in the shorter kilns. With the newly designed cements, their initial quality was important, and ultimate quality was lost sight of. It is well known that high lime cements, while yielding initially high strengths, tend to retrogress with age. In the scuffle someone lost sight of the alkalies and sulphates in cement. Whereas in the shorter kilns they had been expelled to a great extent due to the high back end temperatures which ranged up to 2000 deg. F., in the longer kilns where back end temperatures ranged as low as 300 deg. F., they became concentrated and total alkali and sulphate contents increased in the cement. Recent failures of concrete in which cements high in alkali content were employed, have now brought a number of these matters to light. There is no question but that a number of failures of concrete in recent years, for which free lime and the delayed expansion of magnesia was blamed, could readily be traced to the alkali-

lies, the sulphates, and possibly the sulfides present in the cement. It is also admitted that a number of present day failures in concrete for which the alkalies are blamed, may at some later day be traced to other of the minor constituents present in cements. The diseases acquired by some of the present day cements, however, are the result of salesmanship which promoted the new high-early-strength types of cement, and necessitated the use of larger units in cement plants to promote economy in their manufacture.

Twenty years ago about 22 percent of all the cement kilns in operation were from 60 to 80 ft. in length; about 25 percent of the kilns were 100 ft. in length; about 33 percent of the kilns were 125 ft. in length; 14 percent of the kilns were 150 ft. in length; 4 percent were 175 ft. in length; 2 percent were 200 ft. in length and only 1 percent of all kilns exceeded 200 ft. in length.

Today, only about 5 percent of the cement kilns in operation are 60 to 80 ft. in length; 20 percent are 100 ft. in length; about 30 percent are 125 ft. in length; 15 percent are 150 ft. long; 12 percent are 175 ft. long; about 5 percent are around 200 ft. long and over 14 percent are above 200 ft. in length, some of these approaching 500 ft.

Alkalies and Kiln Length

At a meeting in Denver in February, 1941, cement producers and consumers gathered to discuss the alkali problem that had crept into the general matter of cements and their effects on the permanence of concrete.

Statistics were produced concerning 12 cements of which six had been produced in dry process plants having kilns whose lengths ranged up to 150 ft., the remaining six cements having been produced in wet process kilns whose length ranged up to and above 340 ft. The average sodium oxide (Na_2O) content of the wet process cements was 0.30 percent, the high being 0.87 percent and the low being 0.05 percent. The average sodium oxide content in the dry process cements was 0.24 percent, the high being 0.62 percent and the low 0.02 percent.

In the matter of potassium oxide content in the cements (K_2O), the average in the wet process cements was 0.58 percent, the high being 1.32 percent and the low being 0.05 percent. The average potassium oxide content of the dry process cements

was 0.27 percent, the high being 0.53 percent and low being 0.11 percent.

The total alkali content (Na_2O plus K_2O) of potassium and sodium oxides averaged 0.89 percent in the wet process cements and 0.52 percent in the dry process cements.

As in other articles written on the subject, the writer is not condemning the wet process in favor of the dry process, nor the longer kilns in favor of the shorter kilns. He is attempting to analyze the why's and wherefore's of alkalies in cements. For a number of years, and at the present day there has been and continues to be a general condemnation of special cements that have been designed with the object in view of correcting some of the faults and consequences of portland cements. These special cements include the high silica and the pozzolana types, often called blended cements. Specifications have been talked for them for years, and a lone U. S. Federal specification now protects them. To those who have opposed special cements it has possibly not occurred to them that the addition of pozzolanic materials to portland cement has a tendency to correct a number of the ills present in the portland cement. A little investigation upon the part of these opposers of special cements might result in their finding that the addition of pozzolanic materials, natural or artificial, to some portland cements high in alkali and sulphate content, has a most pleasing effect in neutralizing whatever harmful effect these alkalies and sulphates in cement might have upon the permanency of concrete.

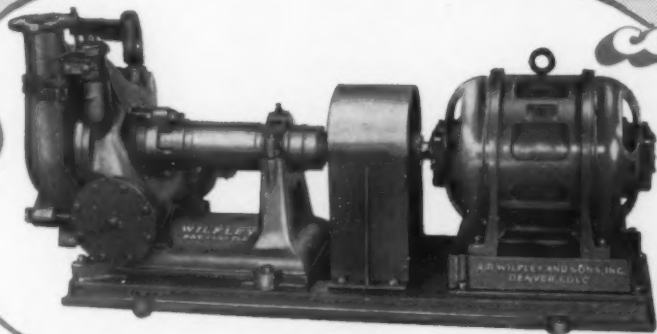
As a result, manufacturers of portland cements having high alkali and sulphate contents, whether due as a result of high alkali or sulfur contents in their initial raw materials, or sulfur present in fuels, or reducing or oxidizing atmospheres prevailing in kilns, or due to low back end temperatures in the extremely long kilns which results in a concentration of the alkalies and sulphates, may find it to their immediate advantage to revert to the manufacture of special cements of the high silica or pozzolana types, rather than cut up their long kilns into two or three units and be put to considerable expense in the procedure. A continuation of the appearance of specifications limiting the amounts of the alkalies that may be present in cements, will determine a number of these things.

(Continued on page 80)

REDUCE COSTS WITH

High Efficiency

WILFLEY
centrifugal PUMPS



**Creating a NEW high
Standard of Dependable
Performance**

In times like these, when continuous, uninterrupted PERFORMANCE is all-important—WILFLEY High Efficiency pumps are doing their part in stepping up production to new record-shattering levels. Exclusive features of design, construction and engineering give WILFLEYS the dependability and capacity that make them a NUMBER ONE requirement in the handling of slimes, sands and slurries. Heavy pumping parts of rubber, alloy iron, alloy steel—each has its application. WILFLEY selects the exact combination that delivers best results on YOUR particular job. If you want a pump that runs continuously without attention, write, wire or phone for complete information and individual engineering service.

A. R. WILFLEY & SONS, INC.
DENVER, COLO.

NEW YORK OFFICE: 1775 BROADWAY, NEW YORK CITY

"Let's Have Continuous, Uninterrupted Production"

Assuming that the 12 cements previously discussed are a cross section of portland cements as they are produced today, the fact that cements produced by the dry process in kilns having lengths of 150 ft. and less contained 58.3 percent less of the total

alkalies than did cements produced by the wet process in kilns ranging from 175 ft. up to above 340 ft., should explain something or other, and producer as well as consumer of cement will learn considerably more about the subject in the near future.

We have found that a clear, ringing tone of a pat indicates sound and a dull one an unsound cement, according to parallel autoclave tests, on clinker, standard portland cement and mixtures of sound and unsound materials.

Lately, in order to approach the temperature of the autoclave test, the oil has been heated to 200 deg. C. (392 deg. F.), 210 deg. C. (410 deg. F.), and 215 deg. C. (419 deg. F.). Too few (only about 100) of these tests have been made, to judge its special merits. This was not tried out before, because the results of 170 deg. C. have agreed closely with the autoclave test, and also as we feared that continuous high temperatures would break down the structure of the oil.

A few experiments also have been made lately to determine the tones produced in pats and bars ($\frac{1}{2}$ x $\frac{1}{2}$ x 7-in.). It was at first thought possible to recognize various degrees of soundness (or rather of the injurious forces of expansion) in cement, as is done in the autoclave test. The few results so far obtained are not up to the expectations; this depends at least partly on the method used in estimating the sound. But even the results from better observations might not be reliable as the fineness of the cement seems to affect the tone of the treated pats. This, if confirmed, would evidently mean that any numerical estimate by the aid of the tone would not value the soundness alone, but instead the combined effect of soundness and fineness.

About 1000 parallel tests also have been made with pats treated at 338 deg. F. in the oil bath and with pats and bars heated to 422 deg. F. in the autoclave. The two kinds of treatment gave closely the same results.

As described above, the oil-test was adopted here some time before the autoclave method as more reliable than either the steam or boiling tests.

It is used as a routine control test of the manufacture, because it is easy to make, and it agrees closely with the autoclave test (at least here).

On account of the simplicity of the method, anyone interested in the subject will have no difficulty in making the test. For this reason, long tabulated records have been omitted.

The experiments resulting in the new soundness test were carried out in cooperation with R. Grosch, chemical engineer at the St. Mary's Cement Co., Ltd., to whom I am indebted for many valuable suggestions.

Soundness Test for Portland Cement

By A. G. LARSSON*

A SIMPLE METHOD to determine the soundness of Portland Cement has been developed at the St. Mary's Cement Co., Ltd., where it has been in continuous use for five years, parallel with other soundness tests to control the manufacture of clinker and cement. Other methods in daily use here are the 5-hr. steam test (C.E.S.A. Standard) the 10-hr. boiling test (started here as a control test in 1912) and the autoclave test (adopted here in June 1937). The latter is the standard but the others for various reasons have been retained in the routine testing.

The autoclave method does not lend itself to routine control of the manufacture, at least not in the way it is carried out here, because too much labor and time are required, and also because too few test pieces can be handled in one treatment. It is true that the half bars might be used, but when doing so we evidently multiply any possible errors by two as compared with the standard length. In 1912 the author started the 10-hr. boiling test as it is undoubtedly more effective than the 5-hr. steam test. Later on it became evident from investigations conducted especially by the Portland Cement Association that modern cement required still more effective soundness tests. From the point of view of the cement maker it seemed desirable to develop, if possible, a test that could be used for the routine-control of manufacture.

It was thought that such a method ought, (1) to give reliable results; (2) to be comparatively easy to carry out; and (3) to allow the treatment of a large number of test pieces at one time.

From observations made during a period of five years, the author believes that the above three aims have been closely approached by the method described below. Some of the reasons for publishing a description

of the test are: (1) to invite criticism or suggestions for further improvements; (2) to find if it is equally suitable for other brands of portland cement or not.

Soundness Test Procedure

The test is carried out in the following manner. Pats made from paste of normal consistency and cured at least 24 hours in moist air are used. These were at first made by the trowel on 4- x 4-in. glasses. This method resulted, however, in variations in size, form, and thickness. But as it seems desirable to have the pats as equal as possible in every respect, they have lately been formed in 3-in. watch glasses of uniform depth of concavity. After curing in moist air, the pats are immersed in a bath of liquid Paraffin oil (also called Russian oil) of room temperature. The heat is then raised during the first hour to 170 deg. C. (338 deg. F.) and kept at this level for three hours, after which time it is turned off, and the test pieces taken out and inspected.

Distortion, cracking, checking and integration are evidently unfailing signs of unsoundness, but results of this kind can hardly be expected nowadays, when the ceiling for expansion is set at 0.5 percent by the autoclave test.

More delicate indications of unsoundness are therefore required. Let us assume actual unsoundness as the starting point for the solution of the problem. It seems reasonable to assume that any expansion stronger than the strength of the more or less hardened paste at the time of the test must form cracks, which, as functions of the reacting forces, will vary with the degree of unsoundness. The resulting cracks therefore might often be too fine to be visible to the naked eye. However, they will break the continuity of the mass in the hardened pat, and thus dull the tone, which otherwise would be clear.

*Chemist, St. Mary's Cement Co., Ltd., St. Mary's Ont., Canada.

Solving Bin Problems

Three Kinds of Portland Cement
Ought to Fill Any Normal Need

By A. R. ELLIS*

THIS QUESTION of storage of portland cement, between its time of manufacture and time of its use, is one that has vexed the engineer, the contractor and the portland cement manufacturer for many years.

Forty-odd years ago most specifications required the producer to store his cement at least 90 days before shipment, and required the contractor to build storage houses and store the cement on the job until released by the results of tests on samples taken after the car was loaded at the mill. Now the clinker is stored—that helps, but does not entirely solve the problem.

Obviously this put an extra cost on both the cement manufacturer and the contractor. It also involved an extra financing charge, spread over the approximately 120 days' time involved between the time the cement was manufactured and the time it could be accepted and paid for.

If portland cement were a stable product, at the time manufacture is complete, then the proponents of "bin tested cement" would have a better argument for their position. The fact that it is not, in some instances, gives

the proponents of the theory of testing after delivery, some foundation for their argument.

On the other hand, unless the latter have some means of storing the cement before it is used, then they are apt to find themselves in trouble with their concrete if tests after delivery and after use show that the cement does not meet specifications. It is not very often that one hears of concrete being dug out of construction work.

Owing to the natural variation in raw materials, there are times when the resulting cement product may be sub-standard or off-quality. This is not thrown away. It may or may not be brought up to standard by blending with a product of known quality; hence the need for testing the finished product. I do not believe the engineering fraternity will ever waive the testing of portland cement before its use.

If a cement manufacturing concern knows its product is going to be tested after delivery, there is no question but what it will make extra sure that the cement on that particular order will come well within the limits of

● **THIS ARTICLE** was written two years ago when cement manufacturers were sweating over the problem of bin storage, testing and shipping nearly "57 varieties" (more or less) of portland cement. It was intended to be a part of the discussion of the Bin Problem in our August, 1940, issue.

The article (with apologies to its author) has been in the editorial files ever since, because the bin problem subsided. Now that the federal government has stepped into the picture to undo part of

the tangle it helped to create itself, Mr. Ellis' article is all the more interesting.

In permitting its publication at this late date, Mr. Ellis writes: "I have frequently expressed my views on the unnecessary number of cement specifications, and I now take some satisfaction, and considerable amusement, from the situation which has developed by reason of our so-called war economy, which is apparently going to reduce the number of grades of cement to three, which I still believe is sufficient."—The Editor



A. R. Ellis

the specification covering the order. Indeed it may cause the concern to raise the price in order to take care of that extra hazard, involving possible back freight charges or other charges which may be a part of its agreement with the purchaser. I do not know this to be a fact, but it is within the realm of possibility.

So far as bin tested cement is concerned, the proper way to sample is to sample while the cement is being ground into the bin, and when it is shipped the bagging equipment should be emptied by filling bags going into other channels, before running cement out of the tested bin. That is what is being done now in the case of a well regulated mill with carefully inspected product.

I have no doubt but that the accommodating of so many testing agencies is a vexing problem for the cement industry. There are a lot of them—federal, state, county, city, corporation and commercial testing agencies. Some of them are really testing the cement; some of them are short-cutting; some of them are waiving or getting waived certain clauses in the specifications; some of them are otherwise cheating and throwing their samples out the window.

No Generally Acceptable Certification

In order to be able to certify to the quality of cement in a bin, the

(Continued on page 96)

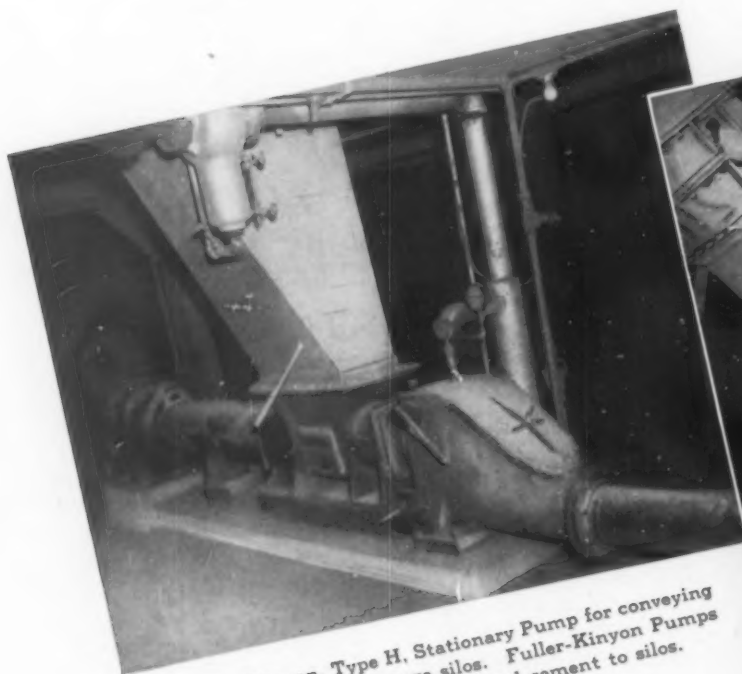
* President, Pittsburgh Testing Laboratory.

Another Cement with

Although the use of much Fuller equipment has been considered standard practice in the cement industry for many years, modernization programs, so numerous during the past few years, has seen a far greater trend toward the adoption and use of more and more equipment manufactured by this company.

One of the most recent plants to undergo many modernization changes is that of the Penn-Dixie Cement Corporation, Plant No. 4, at Nazareth, Penna. Fuller equipment installed, some of it illustrated on these pages, is of material help in the efficient, low-cost operation of this plant.

When you have a problem, big or little, why not call on Fuller? We're here to help in any way we can . . . no obligation on your part.



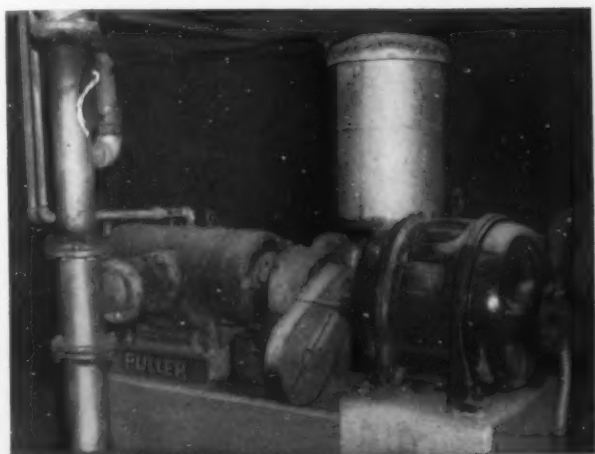
Fuller-Kinyon, Type H, Stationary Pump for conveying of raw materials to storage silos. Fuller-Kinyon Pumps are also used for conveying finished cement to silos.



Rotary Gate Valves and Rotary Feeder for controlling flow of raw materials from silos to screw conveyor.

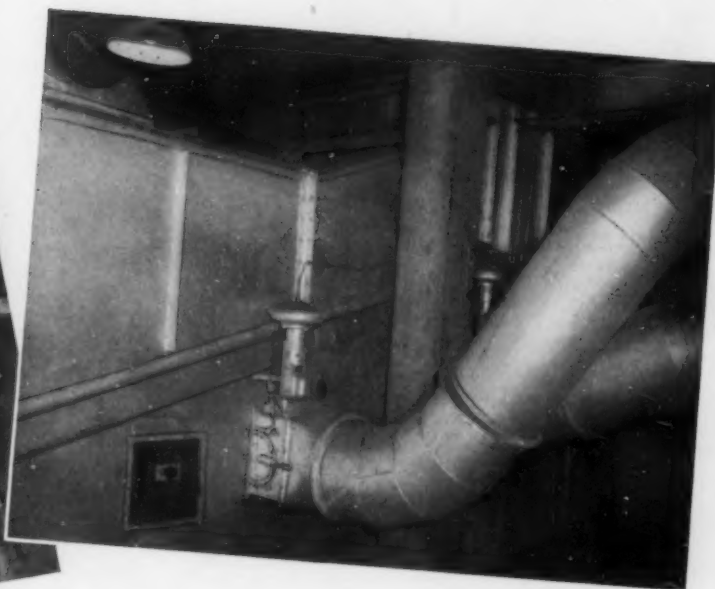
FULLER COMPANY
CHICAGO—1144 Marquette Bldg.

Plant Modernized Fuller Equipment



Left: Fuller Rotary Single-stage Compressor furnishing air to the Fuller-Kinyon Pump handling raw materials shown on opposite page.

Below: Exterior view of Fuller Air-Quenching Cooler. Lower left: Interior view of cooler looking toward feed end showing clinker discharging from kiln. Four of these coolers are installed in this plant.



G-26T

CATASAUQUA, PA.
SAN FRANCISCO—320 Chancery Bldg.

Ore Sintering In Rotary Kilns

THERE ARE MANY rotary kilns in lime and cement plants nearer to ore deposits than are the blast furnaces or smelters. If the lime and cement industries are curtailed by the war production program, these rotary kilns may be converted for sintering ore, which is a method of concentrating it, or making it more suitable for the blast furnaces or smelters.

The possibilities in this field were

May use lime and cement rotary kilns to step up production of metals

who wish to pursue the subject farther.

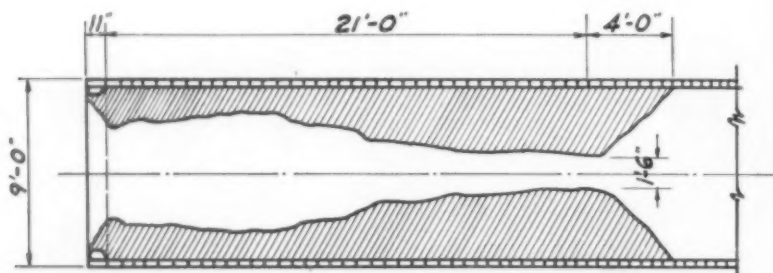
Mr. Thyrré said by way of introduction: "A few weeks ago while visiting a cement plant in one of the

way to supplement the normal capacity of the steel company's sintering facilities, and with all respect for the spirit of coöperation shown by the cement company in undertaking this contract, it was a very difficult situation because the plain rotary cement kiln is not at all suited for this work.

"This visit brought back the picture of all the troubles and hardships encountered a good many years ago when the rotary kiln was first employed for sintering of blast furnace dust and iron ore fines; and this picture, based upon actual operating experience, is no doubt fresh in the minds of many iron and steel producers today, and justifies the skepticism one meets when attempting to explain the engineering development of the rotary kiln for sintering and the many improvements in design and construction which have taken place during the last 15 years."

The difficulty arises, according to Mr. Thyrré, from the tendency for the material in the kiln to stick to the lining, until one has a condition illustrated in the accompanying sketch. Unless the lower part of the kiln and the fire control are especially designed for ore sintering, the removal of the lining ring is too

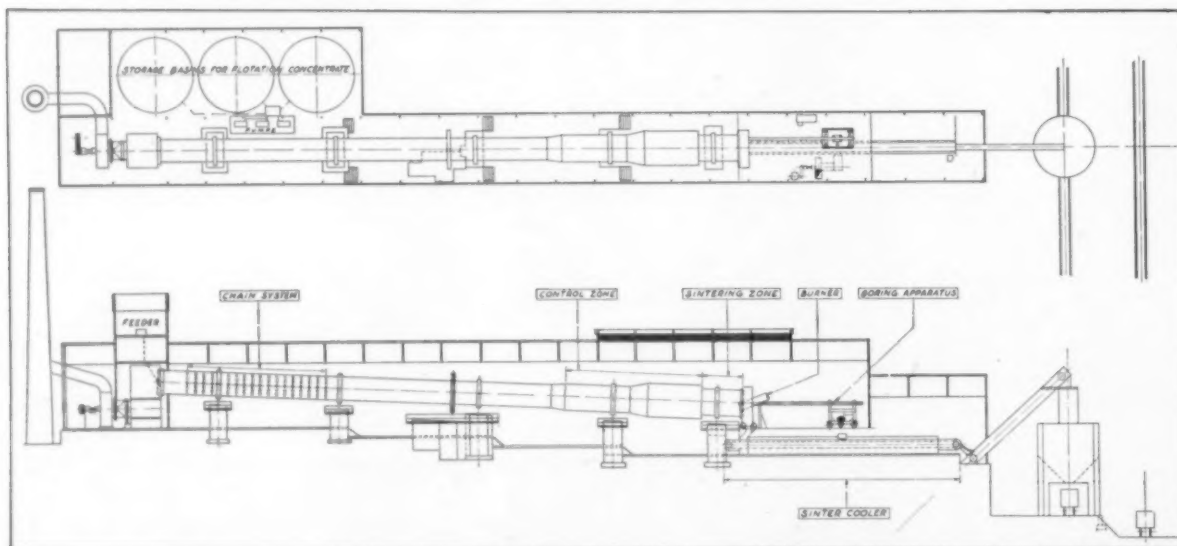
(Continued on page 86)



Contour of ring formation in a 9- x 175-ft. plain rotary kiln sintering iron ore after a few days' operation

described in considerable detail, about a year ago, in a paper by S. G. Thyrré, vice-president, F. L. Smith & Co., before the Eastern States Blast Furnace and Coke Oven Association. The following extracts are taken from that paper. It is presumed the whole paper is available to those readers

Eastern States, the occasion presented itself to inspect the operation there of one of the plain, straight rotary kilns used temporarily for nodulizing or sintering pyrite cinders for one of the large steel companies. Evidently, as a result of the present emergency, it was attempted in this



Rotary kiln installation especially designed for sintering ores which stick to lining of kiln

EIMCO Slurry Filters



Reduce Coal Consumption



Increase Kiln Capacity

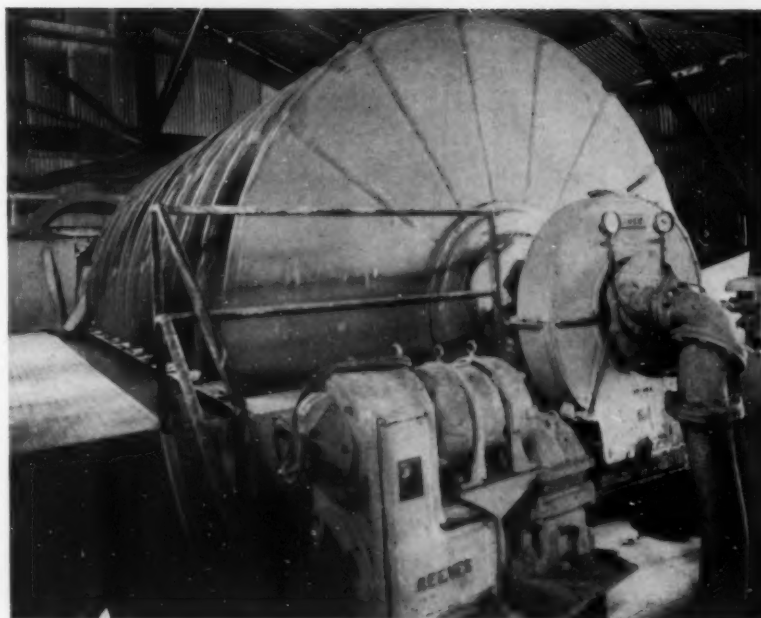
OHIO CEMENT PLANT ALSO INCREASES WASTE HEAT BOILER EFFICIENCY, IMPROVES GRINDABILITY AND GAINS CONTROL OVER RAW MATERIAL UNIFORMITY

At the Silica, Ohio plant of Medusa Portland Cement Company, New EIMCO Slurry Filters are giving very tangible evidence of their contribution to improved clinker burning.

Two of the three filters recently furnished this Medusa plant by EIMCO are now in operation, and preliminary checks show:

1. Coal consumption has been reduced materially per barrel of clinker produced.
2. An increase in capacity on each of the two kilns fed through the new filters has been experienced at this plant.
3. Waste heat boiler efficiency has been increased appreciably as a result of the filter installation.
4. Grindability of raw material has been increased.
5. More accurate control of raw material uniformity (composition) is now possible.

WRITE YOUR NEAREST EIMCO ENGINEER for detailed information on Slurry Filters or other EIMCO products for the Rock Products field listed below.



AT MEDUSA'S SILICA, OHIO PLANT—The three new Slurry Filters at this plant are the largest known filters to be used on 10-foot by 150-foot kilns. Each filter has eleven discs, each 12-feet six-inches in diameter . . . providing 2,398 square feet of filter surface per filter.

THE EIMCO CORPORATION

Chicago Office
111 W. Washington

Factory: SALT LAKE CITY, UTAH

New York Office
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EIMCO

DRUM FILTERS
DISC FILTERS
EIMCO-FINLAY LOADERS
JAW CRUSHERS
SPECIAL STEEL CASTINGS

BALL MILLS
ROD MILLS
SUPER-MOLYCHROME BALL,
ROD AND TUBE MILL LINERS
DIAPHRAGM PUMPS

(Continued from page 84)

difficult and expensive. The object is to shorten and enlarge the sintering zone and provide a suitable mechanical device for removing the rings or lining coatings.

The device for removing the coating is a powerful water-cooled boring bar, equipped with a cutter and mounted on a heavy carriage. It operates somewhat in the same manner as a large lathe. The carriage is power-driven and operates on tracks in the burner floor. In sintering iron

ore this boring machine is used 10 to 15 minutes once or twice an 8-hr. shift, according to Mr. Thyre.

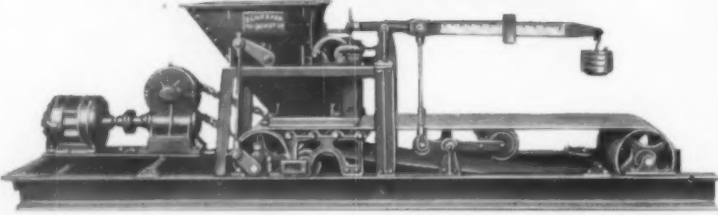
An important feature in connection with the design of the hood is the water-cooled lining plates on which the hot and sticky material from the kiln is discharged. The water cooling of these lining plates prevents adhering of the material to the liner plates due to the "freezing" action. From the hood the material is discharged on a cooler in which the air for combustion is utilized for cooling the prod-

uct, the air thereby becoming preheated to a considerable extent, thus improving the fuel economy and facilitating proper flame conditions.

Sintering Manganese

The Cuban American Manganese Corp. installed a 213-ft. rotary kiln for sintering wet manganese concentrates in 1936. The Victor Chemical Co., Mount Pleasant, Tenn., has another wet process kiln of approximately the same size as the Cuban kiln, installed about three years ago for sintering low grade phosphate ore. This material in the sintering zone is extremely sticky which necessitates using the boring bar more frequently. The feed contains about 25 percent of free water, and the fuel for the kiln consists of CO waste gas from the electric furnaces in which the pure phosphorus is produced. The Anaconda Copper Mining Co., Anaconda, Mont., has a larger kiln of the same type for sintering manganese flotation concentrates. This kiln is somewhat different in design due to the fact the raw material is Rhodochrosite, that is manganese carbonate, whereas in Cuba the raw material consists of oxides. The feed to the kiln contains about 35 or 40 percent water, being underflow from a thickener. Natural gas is used as fuel.

**Over
One Thousand**



SCHAFFER POIDOMETERS

**Designed and Built
to Serve Industry**

With **SPEED
ECONOMY
PRECISION**

In hundreds of plants throughout the world the Schaffer Poidometer has displaced the old rule-of-thumb method of proportioning raw and finished materials.

In every instance the change has resulted in greater production, assured uniformity of product and important economy. Schaffer Poidometers are built to stand hard, continuous service. The increased tempo caused by the war emergency has further emphasized their ability to take it.

But even so, it will pay you especially during this period of high pressure production to check over your Poidometer occasionally and keep it in good condition.

Write for Catalog No. 2

SCHAFFER POIDOMETER CO.
2828 Smallman St. Pittsburgh, Pa.

Lower Freight Rates for Cement Denied

ARKANSAS CORPORATION COMMISSION has denied the request of the Arkansas Portland Cement Co. to reduce carload freight rates on cement shipped 80 miles or less. A complaint had been filed against the DeQueen Eastern Railroad Co. charging that the rate from Okay Junction, Ark., to all interstate destinations 80 miles or less were higher than rates charged for the same distance in Texas. The Commission held that the Texas rates were voluntary and established by the carriers to meet truck competition; that the Arkansas rates had been found reasonable.

Dramatize Safety at Cement Plant

RIVERSIDE CEMENT Co., Crestmore, Calif., recently raised the Victory Safety flag with appropriate ceremonies, the purpose being to promote a "No-Accident-Year Victory" to conserve man power for the war effort. Howard R. Starke, general superintendent, gave the address attendant to the flag raising.

317 STURTEVANT AIR SEPARATORS IN WAR PRODUCTION



Helped Put
**U. S. Cement
Production**

UP* 20%

★ March production figures from Bureau of Mines compared for 1942 and 1941.

Tremendous volumes of cement are going into Uncle Sam's army and naval housing and training buildings, access roads and industrial plant extensions, to knock down the Axis aggressors. Already 317 STURTEVANT AIR SEPARATORS are in use in U. S. cement mills, assuring proper degree of fineness at required capacity, while helping to boost production in numerous cases AS MUCH AS 300%.

Not a Single Rejection

All these 317 STURTEVANT AIR SEPARATORS were installed "on approval" . . .

and *not a single one was rejected!* That's proof STURTEVANT does a real job . . . *can do a real job for you.*

Find out how Sturtevant gives (1) Range of fineness from 40 to 350 mesh, (2) Capacities of ¼ ton to 50 t.p.h., while increasing mill capacity as much as 300%, (3) Controlled specific surface area, (4) Lowered mill and product temperatures.

Write us for latest bulletin and engineering information now!

STURTEVANT MILL CO.

Harrison Square

Boston, Mass.

STURTEVANT

- AIR SEPARATORS
- RING ROLL MILLS
- JAW CRUSHERS
- CRUSHING ROLLS
- SWING SLEDGE MILLS
- MOTO-VIBRO SCREENS
- ROTARY FINE CRUSHERS

How War Has Affected the Portland Cement Industry

THE WAR, or preparation for taking a constantly greater part in the war, has created a greater demand for portland cement than in any year since 1930. There is actual concern on the part of the War Production Board that the federal government may not be able to obtain all the ce-

ment it needs as fast as it is needed. The condition, however, is not a general one. There is more construction activity in the East and Southeast and West Coast than elsewhere. Possibly there are other sections where local shortages are possible, but the industry as a whole appears to be

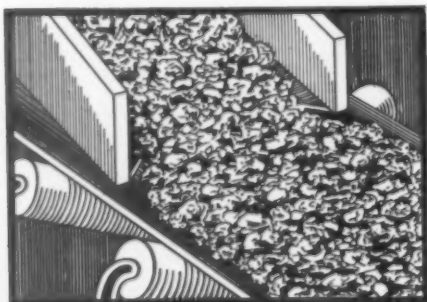
fully capable of taking care of any possible demand.

Much could be done by the industry through directing all shipments toward the zones of greatest demand from zones of greatest competition, where there is over capacity and much needless cross-hauling, but this can not be done without danger of being accused of collusion and being threatened with anti-trust suits. Also, probably, all manufacturers want to retain their holds on these highly competitive markets, and not allow dealers to substitute other brands.

Too Many Varieties

Early in the year, when the W.P.B. first began worrying about possible cement shortages, the point was raised as to the effect of manufacturing so many varieties of portland cement on the producing capacity of the industry. It was not so much a question of the five standard varieties under federal and A.S.T.M. specifications as it was the extra-standard or "bastard" specifications of such public works authorities as the state highway departments, the New York Board of Water Supply, etc. All these required their own special facilities for sampling, storage and shipping. Since it was necessary to tie up bin storage facilities for a year or more, at the call of these purchasers the lack of storage facilities, large as these facilities have been made, more or less determined the productive capacity of the plants in certain sections of the country where the demand for cement appeared to be greatest.

In this dilemma the W.P.B. applied to the American Society for Testing Material for technical advice, and the result was a meeting of Committee C-1 on Cement of the A.S.T.M. in Washington, D. C., on January 30. Out of that meeting grew an agreement to issue Emergency Alternative Specifications which would cut down the present five types of Standard Portland Cement to three. The W. P.B. was then to issue a Limitation Order which would substitute these Emergency Specifications in place of all others for the duration. The federal government emergency specifications were written and promulgated within a few months, and at the June convention of the A.S.T.M. the same specifications were adopted as Emergency Alternative Specifications standards of A.S.T.M. However, up to this writing, the W.P.B. Limitation Order has never been issued and the new emergency specifications are just three more specifications added to those still on the books.



Design Idea

Be sure your feed chute, or a guiding skirt board, loads material in line with direction of belt travel, to avoid crooked running and reduced belt life caused by unequal loading.

Wide capacity loads are better than long-continued dribbling loads concentrated in the center of the belt.

Your BELTING IS HARD TO REPLACE-MAKE IT LAST

FUNDAMENTAL CARE

Regular lubrication is a "must". Check system thoroughly for oil holes and cups that may be hidden because of equipment design or accumulated dirt.

If driving mechanism is hand oiled, a heavy-bodied oil is best because it will hold bearing surface longer in case of neglect. If lubrication is automatic, a thinner oil may be used.

Neglected idler rollers are a constant source of trouble. Where greased by compression cups, grease should be of medium consistency and high quality.

Over-lubricating should be avoided, as oil and grease may reach the belt and attack the rubber.

PHILADELPHIA NEW YORK BOSTON
TRENTON PITTSBURGH CHICAGO
GOODALL RUBBER CO. OF CALIFORNIA
GOODALL RUBBER CO. OF TEXAS

Mill: Trenton, N. J. (Est. 1870)—72 Years of "Know-How", Our Most Valuable Commodity.



GOODALL KNOWS SYNTHETICS

Ever since Synthetic Rubber was commercially introduced, Goodall has been a foremost compounder of this man-made rubber. Today, we are "batching" five of the basic synthetic rubbers for everyday production runs in our factory. When new synthetic and plastic substitutes become available, Goodall-White-head chemists and technicians are ready with the precise formulas, timing and control techniques so necessary for safe, dependable products.

GOODALL

RUBBER COMPANY, INCORPORATED

AMERICAN *Continuous Cement* SLURRY FILTER



1. . . reduces fuel costs by 25% or more
2. . . increases cement kiln capacity by approximately the same percentage



NEW YORK, N. Y.
33 West 42nd St.

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FACTORIES: Hazelton, Pa.—Oakland, Calif.—Orillia, Ont., Can.

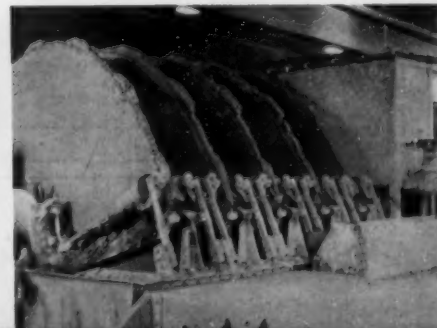
The American Filter does *both* at the same time—not just one or the other.

Either benefit should provide an incentive these days. With the cement industry as a whole faced with possible bottlenecks in fuel next winter and faced with additional demands on its strategically located plants because of certain war developments, such substantial *savings in fuel* and *increased kiln production* should not be ignored.

In this field, as in so many others where separation of liquids and solids is an important processing step, Oliver United has pioneered, developed, and perfected continuous filtration. Over a period of years, the American Continuous Filter has established its savings and production possibilities in many wet process plants.

Our engineers will be glad to discuss cement slurry filtration and its possibilities for your mill. Write or call our nearest office.

8-OUF-2



The new emergency specifications were designed not only to insure greater production but to save the use of critical items such as grinding media and power. This is because the fineness requirement has been reduced and a top limit placed on fineness. It is said that 30,000 tons of grinding media a year are consumed in the manufacture of portland cement. There is no shortage of cast iron at present, however, and chilled cast iron makes satisfactory grinding media.

The new specifications reduce from

5 to 3 the number of *types* of portland cement. Those provided for are Type I—for use in general concrete construction when the special properties specified for Types II and III are not required; Type II—for use in general concrete construction exposed to moderate sulfate action, or where moderate heat of hydration is required; Type III—for use when early strength is required. These correspond to Types I, II and III in the Standard Specifications for Portland Cement as adopted in 1941. Types IV and V, low heat of hydration and

high sulfate resisting cements, respectively, are dropped.

The new emergency specification states, without any pussy-footing, that (a) TDA may be added to Types I and II in amounts not exceeding 0.045 percent by weight of the cement, and to Type III in amounts not exceeding 0.08 percent by weight of the cement. (b) Vinsol resin may be added to Types I and II in amounts not less than 0.025 percent and not more than 0.045 percent by weight of cement.

There is no change in the chemical requirements.

The physical requirements have been changed to make them easier to meet than the old requirements for Types I, II and III, and also to reduce the consumption of power and grinding media. The old Types I and II would more than meet the new specifications except for one provision. There is a *top* limit on fineness. The *maximum* specific surface area must not be more than 2000 sq. cm. per gram in any one sample.

The minimum requirement limit of specific surface area is reduced from 1600 for Type I and 1700 for Type II (A.S.T.M. 1941 Standard) to 1500 in both instances in the new emergency specifications. There are no fineness limits on the Type III cement.

The soundness by autoclave test expansion in the emergency specification provides for a maximum of 1 percent expansion against ½ percent in the A.S.T.M. 1941 Standard.

The requirements for tensile strengths of standard mortar briquets are the same except that the test for specimens 1 day in moist air and 27 days in water (the 28-day test) is dropped altogether.

And there are no requirements whatsoever for compressive strengths in the new emergency specifications.

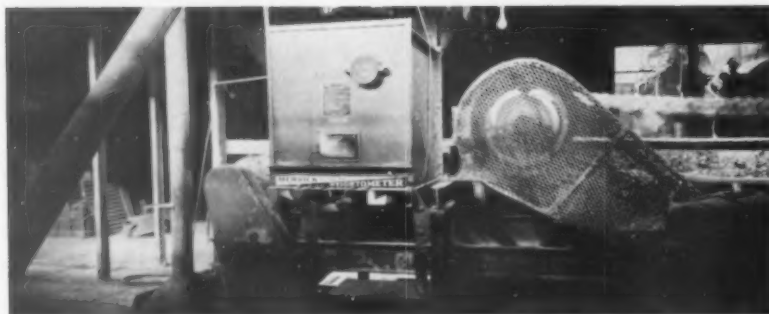
The other changes are in methods of sampling. In the 1940 A.S.T.M. Standard Methods of Sampling 8 lb. samples per 400 bbl. are required; in the emergency specifications each 8-lb. sample is good for 500 bbl. The time of setting is determined for each 500 bbl.; fineness and strength determinations on each 1000 bbl., instead of 800 bbl. (A.S.T.M. Standard 1940); autoclave expansion tests are to be made on a composite sample representing 3000 bbl.

Presumably this lengthening out of samples is done to save time in testing. It shows considerable faith in the uniformity of present-day portland cements.

Statistical Reports

The W.P.B. now requires reports from the portland cement industry on a semi-monthly basis. These are

Dependable WEIGHTOMETER AUTOMATICALLY RECORDS CLINKER TONNAGE in Prominent Cement Plant



GIVING DAILY CHECK ON KILN EFFICIENCY BY CONTINUOUSLY WEIGHING CLINKER ON CONVEYOR

● When every move counts today and maximum efficiency is the goal of industry, Merrick WEIGHTOMETERS fill an important role. A typical application is illustrated here in a busy cement plant, which without interrupting production, automatically records the weight of clinker on the conveyor as it moves to storage bin. A daily check, or at any desired interval, is made on tonnages for plant records and the efficiency of each burner.

No time is lost when weighing with Merrick Conveyor WEIGHTOMETERS because materials are weighed on the Conveyor while in transit.

This is only one of the many applications where WEIGHTOMETERS provide users with accurate records, automatically recorded. It will pay you to investigate their varied applications. Write today for illustrated catalog.

Merrick also offers FEEDOWEIGHTS for automatically Proportioning and Feeding by weight raw materials as well as Clinker and Gypsum to finishing mills.

MERRICK SCALE MFG. CO.
Automatic Continuous Weighing Machines
PASSAIC NEW JERSEY

GAYCO LEADS



THE CEMENT INDUSTRY
to increased capacity and
greater recovery of fines!



**WRITE
TODAY**

Cement mill operators everywhere report that GAYCO Air Separators have increased their capacity 25 to 40% with 25 to 30% greater recovery of fines. They materially increase the capacity of all types of grinding mills by removing the fines as they are made and preventing the cushioning effect of the fine material.

Easily adjusted to deliver products of any desired screen analysis from 60 to 400 mesh, and when once adjusted they are not affected by variations of speed or rate of feed. Always produces the same uniform products at the same setting. Adjustment for any product can be noted and returned to at any time.

One of the exclusive GAYCO features is the new type adjustable centrifugal sizing fan for rejecting coarse particles.

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"RELIANCE"
CRUSHING, SCREENING
AND
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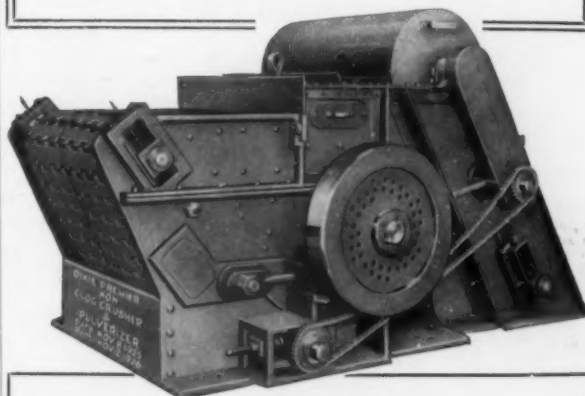


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WHEN PRODUCTION CANNOT LAG

DIXIE GETS THE CALL!



DIXIE Non-Clog HAMMERMILLS

NOTE THESE TYPICAL TOUGH JOBS
LICKED BY DIXIES

1. Replaced four crushers for high moisture content bauxite . . . cut power in half . . . reduced drying costs . . . increased production.
2. Efficiently crushing clay balls to reclaim phosphate in Florida phosphate plants.
3. Crushing phosphate muck in T.V.A. Tennessee plant.

HERE'S WHY . . .

The Dixie Non-Clog Hammermill is the only crusher with a moving breaker plate. Provides positive mechanical feed. No manual pushing of material needed. Even the most plastic, wet, clayey material will not slow production or clog hammers. This feature alone has saved the cost of 10 men in one company!

And because the Dixie moving breaker plate can be moved forward or backward from the hammer points, quality and size of production can be controlled. This feature provides additional assurance against clogging. These are but two of Dixie's outstanding features. Send coupon below for free booklet, "More Efficient Crushing of Raw Materials" which gives complete facts.

DIXIE MACHINERY MFG. CO.

4202 Goodfellow Blvd., St. Louis, Mo.

GET THE FACTS!

Dixie Machinery Mfg. Co.,
4202 Goodfellow Blvd., St. Louis, Mo.

Please send free booklet on Dixie Non-Clog Hammermills. We want to crush.....

Name

Company

Address

CityState

still made to the Bureau of Mines, which does the statistical work. Reports are required for each plant separately. Item 1 of the report calls for barrels of cement and finished clinker of each of the three Types I, II and III and "all others," with the total, at the end of the last period. Item 2 calls for production statistics on each during the period. Item 3 is for totals of Items 1 and 2. Item 4 calls for shipments during the period and Item 5 for the stocks on hand at the end of the period.

Then four questions must be answered (1) Are you behind in shipments on any contract?—give de-

tails; (2) Shipping requirements for remainder of the year?; (3) Are you expecting new contracts requiring large quantities of cement?—give details; (4) Describe operating conditions.

Since these reports have been coming in, it is understood that the W. P.B. is no longer so much alarmed about lack of productive capacity.

The portland cement industry is fortunate in the close contacts it has thus established with the W.P.B.; these should also prove helpful in obtaining for the industry necessary repair and maintenance parts under P-56.

The industry comes under the Building Materials Branch, Division of Industry Operations, of which J. L. Haynes is chief. G. B. Arthur, who is an engineer and who knows the industry, is chief of the Concrete Materials Section.

W.P.B. Cement Advisory Committee

THE FOLLOWING CEMENT PLANT officials constitute the new industry advisory committee of the W. P. B., with John L. Haynes presiding as chief, building materials branch: M. M. Alexander, Missouri Portland Cement Co., St. Louis, Mo.; Garner A. Beckett, Riverside Cement Co., Los Angeles, Calif.; L. N. Bryant, Green Bag Cement Co., Pittsburgh, Pa.; R. W. Crum, Highway Research Board, Washington, D. C.; A. E. Douglass, Allentown Portland Cement Co., Catasauqua, Pa.; Edwin P. Lucas, Superior Portland Cement, Inc., Seattle, Wash.; L. Morris Mitchell, Merritt, Chapman & Scott, New York City, N. Y.; John F. Neylan, Lone Star Cement Co., New York City, N. Y.; W. C. Russell, Peerless Cement Co., Detroit, Mich.; Blaine S. Smith, Universal Atlas Cement Co., New York City, N. Y.; S. W. Storey, Trinity Portland Cement Co., Chicago, Ill.; W. A. Wecker, Marquette Cement Mfg. Co., Chicago, Ill.; Joseph S. Young, Lehigh Portland Cement Co., Allentown, Pa.; Herbert A. Snow, Portland Cement Co. of Utah, Salt Lake City, Utah.

Cement Production at High Level

BUREAU OF MINES reports that the portland cement industry in May, 1942, produced 16,119,000 bbl., shipped 16,349,000 bbl. from the mills, and had in stock at the end of the month 24,882,000 bbl. Production and shipments of portland cement in May, 1942, showed increases of 9.4 and 1.9 percent, respectively, as compared with May, 1941. Portland cement stocks at mills were 9.4 percent higher than a year ago.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 155 plants at the close of May, 1942, and of 156 plants at the close of May, 1941.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	May 1941	May 1942	April 1942	Mar. 1942	Feb. 1942
The month..	69.0	77.0	69.0	61.0	57.0
12 months...	57.0	71.0	70.0	69.0	69.0

Want to solve your FEEDER problem AT LOW COST?

Learn How
To Secure . . .

ACCURATE FEED CONTROL



COMpletely control the flow of any size material from storage bins, hoppers or open-dump chutes to crushers, conveyors, screens, etc. Low in maintenance and power consumption. Furnished in sizes to suit your operation. Send full particulars for recommendations.

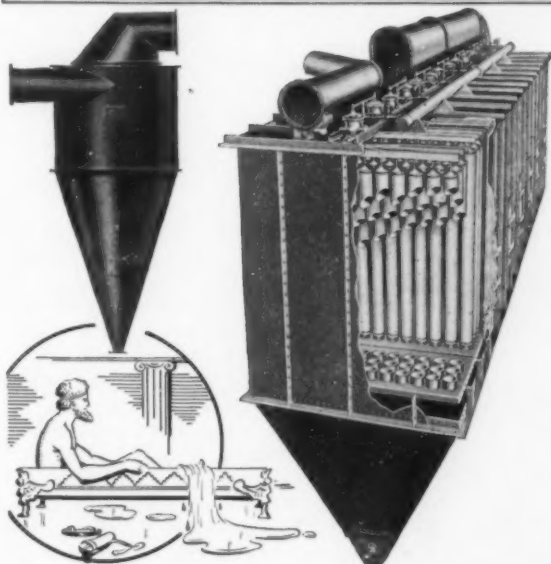
Ross Screen & Feeder Co.

19 Rector Street
New York, N. Y.

11 Walpole Road
Surbiton, Surrey, England

ROSS FEEDERS

Nature Makes the Rules
for *Dust Collection*



YOU COLLECT MORE DUST at Less Cost because Norblo Uses Natural Principles

Drop in velocity is nature's method of collecting dust. In dust collection systems velocity is dropped only by expanding air and air can be expanded only by ample room.

This principle is utilized fully in NORBLO Automatic Bag Type Dust Collectors which have the largest ratio of air expansion space to cloth area regularly employed in any bag type system. In NORBLO H. E. L. S. Cyclone Dust Collectors velocity drop is attained by the patented expanding nozzle and complete absence of vanes or baffles.

NORBLO Dust Collectors based on this natural air expansion principle give you highest dust collecting efficiency at low operating cost, as evidenced by low static drop and consequent power saving. At 2 cents per k.w.h. every h.p. you can save means \$200 to \$400 per year.

Write for new informative and detailed literature on NORBLO Automatic and Standard Bag Type, NORBLO H.E.L.S. Cyclone or NORBLO Hydraulic Dust Collectors.

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DUST COLLECTION

THE NORTHERN BLOWER COMPANY
6409 BARBERTON AVENUE • CLEVELAND, OHIO

Conserve SCARCE MATERIAL



- ★ Through Lubrication
- ★ Through Careful Maintenance
- ★ Through Proper Use

YOUR Gardner-Denver rock drills are made from scarce materials—alloys of nickel, chrome, molybdenum, vanadium—high strength alloys that make possible the modern high performance of rock drills.

WPB allocates the necessary "scarce material" for the manufacture of these tools, so important to the production of base metals, and to all defense construction involving rock excavation.

But it is the patriotic duty of users of rock drills to get the most work and longest life out of them, and to:

1. Provide adequate lubrication with proper grade and quality of lubricant.



2. Keep rock drills in good repair to minimize consumption of repair parts.

3. Protect them against the entrance of abrasive cuttings into the working parts.

4. Take precautions against abusive handling.

GARDNER-DENVER Continuous Feed Drifters

Outstanding advantages of the famous Gardner-Denver Continuous Feed Principle include increased drilling efficiency—less vibration—far less wear—unusually low upkeep.



CF89H—the 3½-inch Gardner-Denver Continuous Feed Drifter.



CF79—the 3-inch Gardner-Denver Continuous Feed Drifter.

In addition to the manufacture of certain war materials requiring precision comparable to rock drills, we are continuing full production of our mining equipment to meet your increased needs. Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER Since 1859



(Continued from page 66)

terials fed into the kilns comes out as finished product.

In the beginning dust recovery was largely confined to stack dusts and the electrical precipitator was about the only satisfactory method. Later, when the silicosis problem in allied industries commenced to be agitated, the cement industry gave serious attention to dust collection throughout the plant. This led to perfection in the design of mechanical dust collectors and now some of these have been adapted to the handling of hot kiln gases and dusts, but of course, their efficiency is somewhat lower than that of electrical precipitators.

Although plant dust collection systems have been installed chiefly as a sanitary measure, probably they could be justified as cost savers, since they do recover large quantities of raw materials and finished products, which would otherwise be wasted; and they must also be important factors in saving lubricants and general wear and tear in plant maintenance. Modern plants are now as healthful and satisfactory places to work as are those in any large basic products

industry, as indicated by surveys.

The most revolutionary developments in cement plants in the past 25 years between wars have been in handling both raw and finished products. Miles of belt and screw conveyors have been replaced by pipelines through which pulverized raw materials and cement are pumped as freely as water. Next to the inventions of the Bates bag packer and the valve bag, probably no device has had a more profound influence on the design of cement plants, and on construction operations where large volumes of cement are handled.

Coincident with this development has been the shipping of cement in bulk, which developed to the point of special railway cars designed for this purpose, and special ships for handling cement exclusively. The handling of cement in bulk has made tremendous increase in the past few years, and with the post-war construction of large hydroelectric, highway and public housing projects, undoubtedly will increase in the future. It is conceivable that cement will be delivered in long pipe lines direct from plant to job, where the job is

not too far removed. With booster pumping stations at intervals this seems entirely within the range of possibilities.

Conclusions

We have tried to condense into a brief article, what could be expanded into a large volume. Of course, there is nothing new in the foregoing, but it seems a fitting time to review some of the most important technical developments in the American portland cement industry. In the interlude between now and the return of peace throughout the world, it is to be hoped that all manufacturers will have opportunity to survey and appraise their plants in preparation for an exceedingly active period of post-war construction.

We have not attempted to discuss here such developments as the greatly increased use of instrumentation for control of cement manufacture, for this was and will continue to be a natural result of greater interest in economy of operation and more scientific approach to manufacturing problems. The trend will be much more in this direction and probably

The Williams "SLUGGER" Crusher and Pulverizer Handles "ONE MAN" Stone • Saves Sledging Also Makes 1 1/4", 3/4" or Agricultural Limestone in One Operation



CUTAWAY VIEW
of "Slugger" showing
heavy duty hammers,
liners and discs.

By reducing large rock to 1 1/4", 3/4" or agricultural limestone in one operation, the "Slugger" has enabled operators to produce these sizes at a low cost per ton and with small investment.

Features include—Manganese steel hammers, heavy duty SKF bearings, adjustable breaker plate, hammer adjustments overcome wear, economical to operate.

The "Slugger" is built in Seven
Sizes—from 30 to 150 horsepower
—write for illustrated bulletins
today.

**The Williams Patent
Crusher and Pulverizer Co.**
800 St. Louis Ave., St. Louis, Mo.

SALES AGENCIES
CHICAGO NEW YORK OAKLAND, CALIF.
37 W. Van Buren 15 Park Row 1629 Telegraph Ave.



WILLIAMS
OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
WILLIAMS
PATENT CRUSHERS GRINDERS SHREDDERS

the manufacturing research work of the P.C.A. in the future will be along this line.

Another detail that will receive more and more attention is reliable feeding devices for mills and kilns. All attempts to obtain uniformity in product and processing break-down if constant feed and positive control of feeding devices are lacking. Operators who have studied this problem, even in the most modern plants, say that while checks made several hours apart indicate fairly uniform rates of feed, checks made say at 5-minute intervals show surprising fluctuations. Kiln temperature controls will never be entirely satisfactory if the amounts of material going through the kiln are not accurately under control.

The past has proved that cement plants grow old rapidly. Plants that were new 20 years ago have been almost completely rebuilt since. Probably their original cost is reinvested in them at least every 20 years and perhaps oftener. This means that the industry must make, as it has, large write-offs against depletion, depreciation and obsolescence. It means, for the annual turnover, very large working capital, for almost without exception the industry has rebuilt out of earnings and has *not* charged such rehabilitation to capital investment. The result is that the old established companies are in sound financial condition, and with constantly modernized plants have little to fear from new competition.

Personnel

(Continued from page 76)

and the manufacture of unfamiliar products, every element in the production of goods is being expanded. Many new workers are being recruited; new jobs on new machines in new surroundings are being given to old workers; working hours are being extended; equipment is being operated for longer periods, preventing routine inspections; and management's efforts are being taxed to accomplish this set-up quickly and efficiently. While we are in accord with this step-up, we know that the alarming increase in our accident records is adding responsibilities to our foremen and safety teachers. This all means that accident prevention activities must be stepped up and synchronized with this growing load.

MENOMINEE, WIS., city council recently decided to sell its gravel crushing plant located at Carbondale. The plant has not operated for the past few years.

Maintenance

(Continued from page 74)

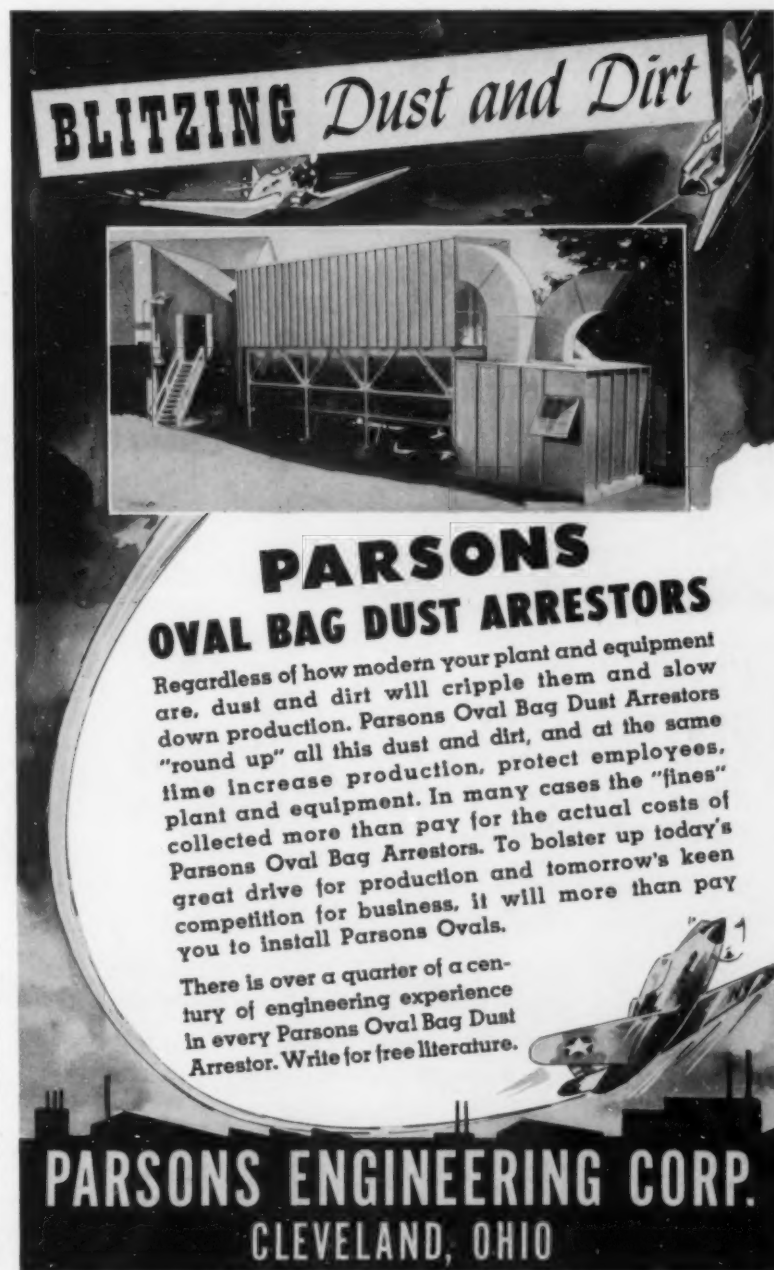
pressed the employees with the importance of using every piece of machinery as long as it is usable, and to use as few new repair parts as possible. We get everything possible out of what we have before replacement."

An operating vice-president:

"We have always maintained our operating machinery in good repair and always have in reserve a good supply of duplicate units. Therefore, we have not suffered any serious loss

in production or increase in maintenance cost during this period. We have instructed our master mechanic and his maintenance crew to watch very closely for any signs of failure and, if found, to repair or recondition immediately. We are especially careful in keeping our motor shafts in line with the gears driving our several high-powered units.

"We have also resorted to more electric welding to harden surfaces on equipment, such as fan liners and blades, dipper teeth, and hammers for secondary crushers, so that we are



BLITZING Dust and Dirt

PARSONS
OVAL BAG DUST ARRESTORS

Regardless of how modern your plant and equipment are, dust and dirt will cripple them and slow down production. Parsons Oval Bag Dust Arrestors "round up" all this dust and dirt, and at the same time increase production, protect employees, plant and equipment. In many cases the "fines" collected more than pay for the actual costs of Parsons Oval Bag Arrestors. To bolster up today's great drive for production and tomorrow's keen competition for business, it will more than pay you to install Parsons Ovals.

There is over a quarter of a century of engineering experience in every Parsons Oval Bag Dust Arrestor. Write for free literature.

PARSONS ENGINEERING CORP.
CLEVELAND, OHIO

able to get a much longer life on this equipment."

A president sums up:

"As a general policy, we are seeking to conserve our machines by avoiding the temptation to overload for this period of emergency production. In the past, we could usually depend on buying a new machine out of a portion of the profits from overloading old equipment. Now we find it is better to pay for more man hours and not attempt to produce at a faster rate per hour. We have fewer breakdowns and steadier employment for our men."

Conclusions

It is obvious from these and other letters received that closer inspection and greater attention to details are more necessary than ever. Even with P-56 priorities that cement plants are now entitled to, there are likely to be delays in obtaining major repair parts such as broken crusher or mill shafts. Proper alignment and lubrication are very important factors in the life of any heavy high-powered equipment. Judged by standards in other countries, Americans are generally accused of abusing their in-

dustrial machinery because of the readiness with which it could be replaced by new and better machinery. Whether it has been so or not, for the time being all will have to operate under a different technique, if they are going to operate at all.

Bin Problems

(Continued from page 81)

bin must be sampled in accordance with the specifications involved, and complete sets of physical and chemical tests, in the required number, have to be made. Some testing agencies, both public and private, are doing this; others are not. Those who are doing it, would not accept the certificates of the ones who are not doing it, so the question of universal exchange of certification by testing agencies is out. The agencies know which ones are doing the work correctly and which ones are not, and so do cement companies, for that matter.

Someone has suggested a government control of the situation and a government certification of cement. I doubt if this could be accomplished—First of all, because I do not believe government agencies want to get into this picture; second, because a number of users of cement would not be satisfied with government service in this respect; third, because a great howl would go up from tax paying testing agencies, of which there are about 200 in the country, with a capital investment of approximately \$20,000,000.

The job of my institution is to test cement under any specification which may be given us. With that situation I have no quarrel, so long as the client is willing to pay what it costs to do the work. During the last few years, however, the ever-changing specifications have made it necessary to make a heavy investment in additional equipment, some of which has become obsolete before it has earned its way.

On the other hand, if I were a producer of portland cement, I think I would be justified in taking the position that there is real need but for three different grades of portland cement:

- 1) A low heat cement for use in large monolithic concrete structures.
- 2) A quick hardening or a high-early strength cement for pavements and other structures where it is advisable or necessary to load the structure as soon as possible after pouring.
- 3) A general purpose cement for general concrete purposes.

**CONGRATULATIONS to the
CEMENT INDUSTRY for its
brilliant performance in pro-
ducing vital materials . . .**



**PLYMOUTH
PERFORMANCE . . .
KEEPS UP THE PACE
FOR MORE PRODUCTION**



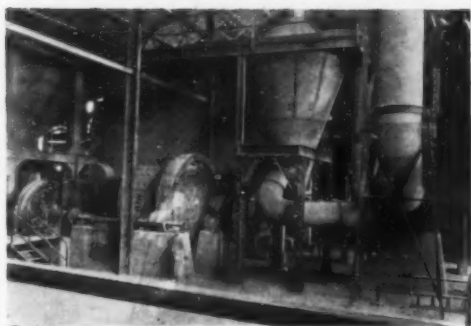
Lucky is the plant that has a Plymouth Locomotive. For here you will find no "bottle neck" in the handling of materials . . . no worries about "how long will it last." But, instead, there's a feeling of satisfaction in knowing that your haulage problem will not be the cause of worry. Plymouth's Performance record in every type of industrial haulage covers a period of many years. And it's one we're proud of. After the war when you can get what you want, you'll be glad you investigated

Plymouth's Performance now.

**PLYMOUTH GASOLINE and DIESEL
LOCOMOTIVES**

PLYMOUTH LOCOMOTIVE WORKS

Division of The Fate-Root-Heath Co. PLYMOUTH, OHIO, U. S. A.



— 1 —

MODERNIZING CEMENT PLANTS WITH HARDINGE MILLS

1—FINE GRINDING OF CLINKER

One of two 10-ft. Hardinge Conical Mills equipped with Superfine Air Classifiers grinding cement clinker to meet rigid specifications. Product fineness is controlled within close limits and unit is dustless in operation.



— 2 —

2—GRINDING RAW MIX DRY

A 10-ft. x 66-in. Hardinge Conical Mill, Air Classifier and "Electric Ear" Sound Control grinding limestone and shale from crusher product to kiln feed in one operation. Maintenance is negligible and uniform control is assured.



— 3 —

3—PRELIMINARY GRINDING OF CEMENT CLINKER

Here Hardinge Conical Ball Mills grind kiln run clinker to a Tube Mill feed in closed circuit with vibrating screens. Capacity of the Tube Mill is greatly increased over previous method of operation and the fineness is held constant.

Write for Bulletin 13-D

HARDINGE

COMPANY, INCORPORATED - YORK, PENNSYLVANIA

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New York, N. Y.

205 West Wacker Drive
Chicago, Illinois

501 Howard Street
San Francisco, California

200 Bay St.
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CONICAL
MILLS



COUNTER CURRENT
CLASSIFIERS



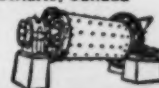
THICKENERS
CLARIFIERS



RUGGLES-COLES
DRYERS



CONSTANT WEIGHT
FEEDERS



TUBE ROD AND
BATCH MILLS

**"Our
760 Yards in
10½ hours of
¾ and Smaller
Crushed Lime-
stone"**

**Says Clarence Dewees,
Marion, Iowa, Contractor**



Universal gives us

"Our last tally was on April 29 when we ran better than a yard and a half per minute, a good part of the time with our 822-Q Plant."

The portable primary, with apron feeder, has a 15"x36" bronze bearing crusher in use nearly 17 years—has only had two new sets of bearings. Over 100,000 yards were crushed with one set of jaw plates. The portable secondary crushing unit has a set of 30"x16" bronze bearing rolls 7 years old, a 4'x8' 2½" deck screen, 24" feed conveyor and 18" under-conveyor from roll discharge to Rotovator.

This is another case where Universal took existing equipment, overhauled it and built it into a modern, efficient plant that provides greater yardage with no additional manpower and very little additional expense. It's service like this and profit-proved Universal equipment that has made Mr. Dewees a repeat buyer time and again.

In times like these, Universal Crushers really earn their service stripes by grinding out rock and gravel without being babied, save time and labor, conserve bearing metals and take the load off replacement parts in general.

Besides indirectly helping the War program with crushing plants for supplying airport and road material, Spreaderollers and Asphalt Plants for seal coating and maintenance, paving of roads and airports, we are helping the armament program directly, a portion of our facilities being devoted to ordnance production. We're "Hundred Percenters" on Employees War Savings Purchases, too!

**UNIVERSAL CRUSHER COMPANY
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Cedar Rapids
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UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

CONCRETE PRODUCTS AND CEMENT PRODUCTS



CONCRETE HOUSING

for

War Workers ★

Construction view of big housing project in Indiana which comprises 59 structures, using concrete block, precast sills and lintels, and concrete floors



Daniel A. Matassino, owner of Continental Block Co.

DANIEL MATASSINO, owner of the Continental Block Co., Farnhurst, Dela., built one of the best-equipped concrete products plants in the East two years ago and, with it, outdistanced all the back-yard plants with which he formerly competed. He started as a partner in a concrete masonry business in 1929. In 1932 he opened his own plant that could turn out 2000 concrete block a day, but he had to compete for the small jobs. Capacity was not sufficient and he could not manufacture the number of sizes to get the big jobs.

In 1940 he built his new plant alongside the duPont highway, just a few miles from Wilmington, and has been busy ever since furnishing

Use Ready Mix Practices For Concrete Block

New plant of Continental Block Co. handles cement in bulk and batches concrete into block machines by gravity

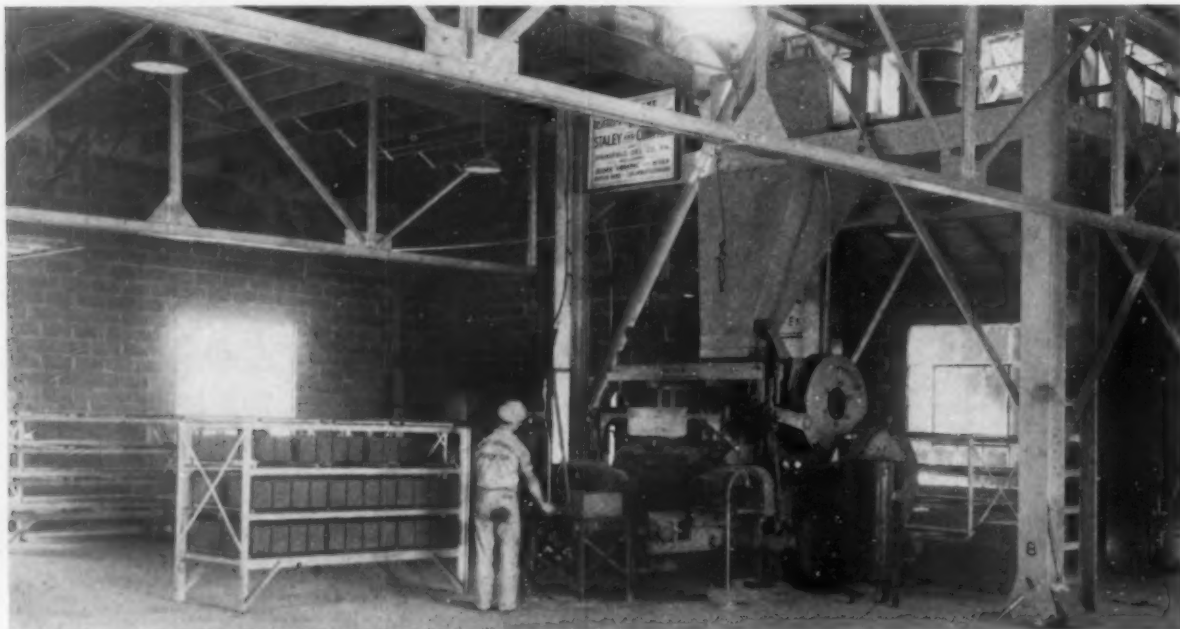
the kinds of jobs that he could not reach before. In 1941, 2,500,000 block, mostly of cinder aggregate, were sold, of which the bulk went into factory construction and commercial building. Probably 15 to 20 percent of it could be considered as defense construction, including units shipped to Baltimore, Md., to help out manufacturers there who were swamped with orders.

Today, 100 percent of his volume would be classed as for defense construction in his own territory. Defense housing projects and powder plant expansion are the main outlets. While his location is just outside Wilmington, the plant was not intended to serve the city of Wilmington and 80 percent of the sales are outside the State of Delaware. The plant was designed and equipped so that he

could truthfully advertise it as one of the most modern plants in the country.

Bulk Cement Plant

Capacity of the plant is 7200 8- x 8- x 16-in. equivalent units a day, equal to the curing capacity in five kilns. In 1941 and 1942, conducting the business has been largely a job of getting large volume production. Prior to 1935, Mr. Matassino was out on the firing line selling by personal contact, but finds it unnecessary now. Much of the business comes in over the telephone, either from customers previously sold or to whom he had been recommended by satisfied users, or directly as a result of telephone directory advertising. Prominent display advertising, built around the plant facilities, is carried in the directory.



Interior view of plant, showing bulk cement handling facilities and mixer on mezzanine floor above block machine

Cut Cost of Concrete Deliveries

Operation of ready mixed concrete trucks under "impossible" road conditions causes costly breakdowns. Contract should provide penalties for delays and poor roadways

ON CONSTRUCTION PROJECTS where large yardages of ready-mixed concrete must be poured, some of the shortcomings in the sound operation of a ready-mixed concrete business have shown up. On some of the large cantonments and other defense projects, many concerns have been taking contracts that are not as profitable as they would seem on the surface.

Evidently no provision is made in some instances to safeguard the producer against unnecessary delays in the contractor's release of his delivery equipment. We know of instances where mixer-trucks have been tied up as much as two hours in discharging a 5-cu. yd. load. A truck would have to be driven to an 8- x 8-in. simple footing to discharge a fraction of a cubic yard, then proceed a considerable distance to another, and so on until the drum was empty. The price per cubic yard was the same as if the truck had been released in ten minutes.

The same truck was forced to travel over fields where no one had any business driving, bogged down twice on one trip, and had to be towed out by a tractor both times. Considerable damage can be done to the truck and it has happened to many. Axles can be torn out, the chassis damaged and excessive tire wear will result from the slippage in trying to get out of the mud.

The solution seems to be in having a contract to protect the producer from these costly and unnecessary practices, or to provide payment for damages and time delay. Contracts binding the purchaser to provide adequate roadways or unloading facilities are justified on any job, whether it be a rush defense job or not. By building such roads and facilities, the contractor can more than save their cost, in efficiency. A badly damaged truck is getting to be almost irreplaceable and would not be of help on other defense jobs to come.

A large ready-mixed concrete com-

pany has developed a contract form which explicitly protects the company against these happenings. This contract is the result of ten years of research, and the study of other contracts in use, and covers just about every condition that could come up. The company operates central-mixing plants and has a large fleet of transit mixers. The contract becomes effective after the form is signed in duplicate by the purchaser and is accepted for the ready-mixed concrete company by an authorized official. In a few instances, when the purchaser might refuse to sign and sends in his order, the company sends him a letter calling to his attention that of course the order must comply with the contracts covering "such and such a case." Usually there is no answer to these letters and, after a reasonable length of time, it is assumed to be all right to fulfill the order. On the whole, the contract has proved out satisfactorily.

Contract Covers Road Conditions and Time Delays

Conditions outlined in the contract which govern road conditions and time delays are particularly interesting. It is stated that the purchaser agrees to furnish suitable roadways

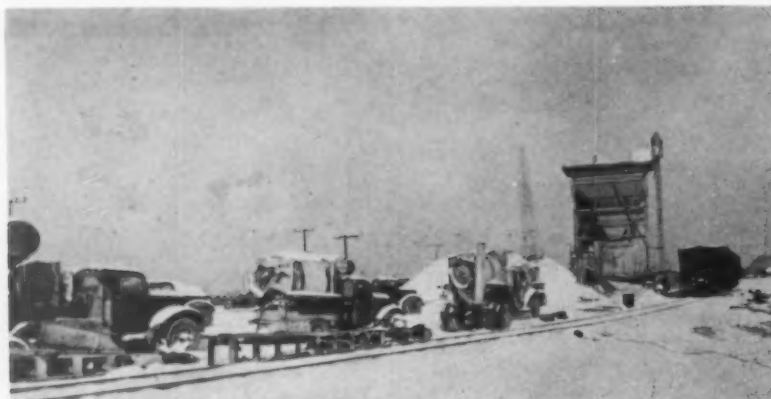
when concrete is to be delivered off of paved streets and that the company reserves the right to stop deliveries until they are provided. It further stipulates that the purchaser must pay for damage to the equipment due to negligence in providing needed facilities, and that deliveries will be discontinued until the cause for the damage has been eliminated.

Prices in the contract are based on prompt unloading of trucks. Thirty minutes free time is allowed for unloading, with overtime billed at the rate of \$4.00 per hour. In case of repeated delays, the right is reserved to discontinue deliveries until conditions are corrected.

These provisions have had to be enforced in some instances. The main salesmen are two "service" or "street" men. When a job has been promised or is in the offing, the service man goes out to the job site and inspects the conditions. No deliveries will be permitted by him until the purchaser cooperates in meeting the conditions set forth in the contracts. His job is to convince the purchaser to spend money making passable roads. On big jobs he often can show the purchaser that these expenditures will earn money for him, in expediting the construction work.



Hub deep in mud but the ready mixed concrete must be delivered to cantonment job



This winter scene of a batching plant may cool you off now, but when the photograph was taken the operators were having a tough time making deliveries

If the purchaser agrees to correct a condition, the service man checks back to see that he did before telephoning the dispatcher's office to start delivery. On questionable cases, a single trial load is sometimes sent out for a test run before releasing more trucks. When a truck gets stuck, deliveries are stopped. The service men, by their inspections, prevent a lot of stoppages. When purchasers have been convinced of the advantages of quick-unloading and good roadways, they often re-locate their hoppers and re-arrange their equipment to speed up the handling of concrete. In many instances the contractors admit that the service men have saved them money.

Correcting Unloading Delays

Granting of 30 minutes unloading time does not mean that that much time will be permitted as a regular practice. A system of debits and credits for time over and under 30 minutes, respectively, was put in effect on only one special job. Each job, rather, is calculated on the basis of known average hauling times and the economies of large loads versus small ones for a given size of job and length of haul. It is known that on certain jobs, 10 or 12 minutes is all that is needed to unload a mixer. If, on these jobs, the time runs consistently higher the service man gets on the job to cut the time down. If it cannot be satisfactorily reduced, one or more trucks will be diverted to another job. When the service man is unavailable on the job, the dispatcher notes the delays in return of the trucks and will pull off trucks if too much time is taken to pour a given number of cubic yards.

Truck mixers carry $4\frac{1}{2}$ cu. yd. loads and over. If a 6-cu. yd. load is calculated to be the most economical way to deliver to a wheelbarrow job the purchaser must provide facilities to release the truck within 30 minutes. He might ask for smaller loads, but he will not get them.

Salesmen Become Service Men

During 1941, which was a heavy production year and a service market that required little salesmanship, the salesmen spent every fourth week at the main dispatching office. This office communicates with the other offices by teletype. The purpose of having these men work on the service end of the business was to better acquaint them with conditions to consider in making promises to future customers.

During that year the salesmen worked intensively on their old customers to keep their good will, in a period where ordinary service had to suffer because of defense construction

demands. They explained why 8:00 a.m. orders sometimes did not arrive until 10:00 a.m. for instance, and why some orders had to be delivered as early as 7:00 a.m. which was to increase the daily capacity $12\frac{1}{2}$ percent. Other provisions, regarding special arrangements for large orders, are outlined in the contract.

Material Handling

(Continued from page 100)

DuPont highway is the heaviest traveled road in the State, and the plant and stockpiles can be seen for miles, which has some advertising value. The plant, designed and equipped by Staley and Co. of Springfield, Penn., is a bulk cement unit. A Butler bin has 300 bbl. storage capacity for portland cement and a second compartment providing for 65 cu. yd. of cinders, 50 tons of slag aggregates and 45 tons of aggregates for gravel concrete block. The bin and a 40-cu. ft. Besser mixer are overhead to feed concrete by gravity into a Besser Vibrapac Plain Pallet Stripper which is turning out close to twelve 8- x 8- x 16-in. units per minute. This plant makes block both in 16- and 18-in. lengths. A Besser pneumatic off-bearer is used to load the block on to racks, which a Lewis-Shepard lift truck takes into the kilns.

Large Stockpiles of Units

Cinders used for aggregates are delivered to the plant by rail from the coal regions and come sized and free from foreign materials. Screw conveyors and the bucket elevators were manufactured by the Columbus Conveyor Co.

Stockpiles usually carry 350,000 units all the time. To expedite han-

(Continued on page 106)



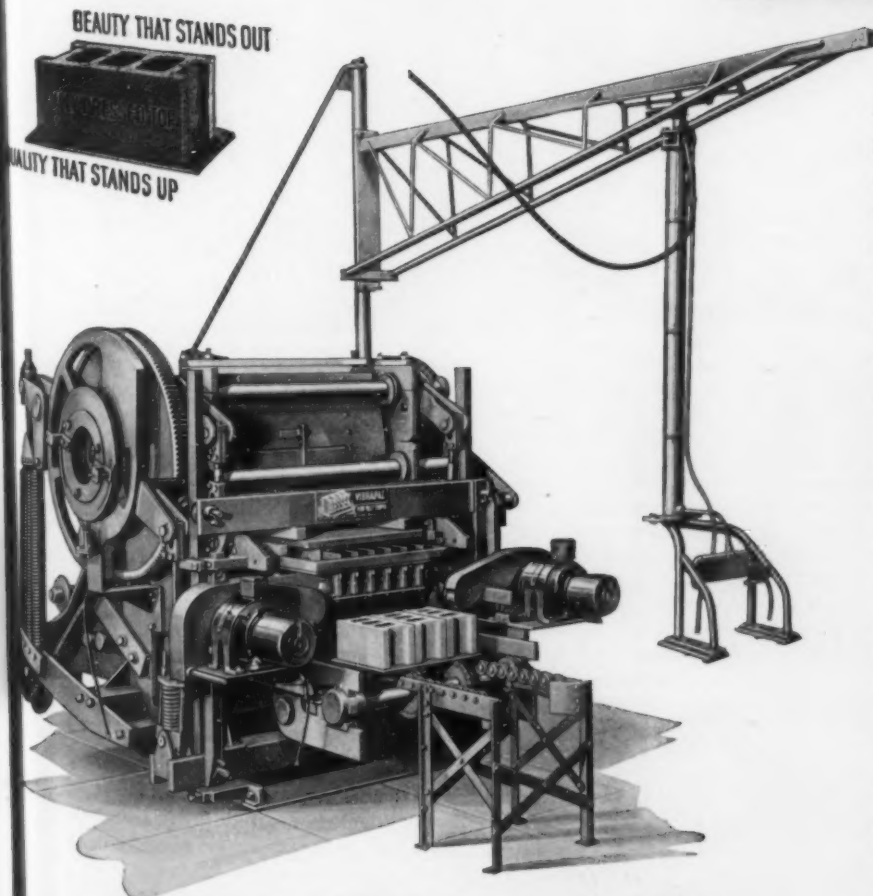
Truck tractor moving a rack of concrete block into the curing room. In the background may be seen the bins above the block machine room

VIBRAPACS Solve a WAR PROBLEM

BESSER PLAIN PALLET STRIPPERS

A Besser Plain Pallet Stripper For Every Need

TAMPERS	Besser Super Automatic	8 Hr. Capacity 3120
	Besser Victory Automatic	8 Hr. Capacity 2160
	Besser Semi Automatic	8 Hr. Capacity 1680
	Besser Champion, Power Operated	8 Hr. Capacity 1000 to 1200
	Besser Multi-Mold, Hand Operated	8 Hr. Capacity 250 to 350
VIBRATORS	Besser Super Automatic Vibrapac	8 Hr. Capacity 4800
	Besser Victory Automatic Vibrapac	8 Hr. Capacity 2160
	Besser Master Vibrapac, Hand Operated	8 Hr. Capacity 800



Besser Super Automatic Plain Pallet Vibrapac with Mixer and Skip Loader.
Capacity 600 8"x8"x16" per hour made 3 at a time on one plain pallet.
Smaller units made in larger multiples on the same pallets.

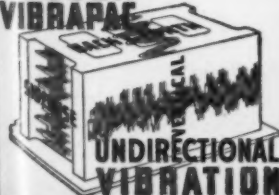
Concrete blocks are playing an important part in the war by replacing critical materials needed for other than building purposes.

Permanence and safety of concrete masonry construction, as well as economy, is coming to be recognized more and more in Government contract building.

A large number of Vibrapac equipped plants are busy producing concrete blocks for defense construction. Many millions of Vibrapac blocks were used for defense building last year.

Thus Besser Vibrapacs are licking another problem and doing a big job in helping to win the war. Vibrapac owners are realizing that greater care of their machines is a duty to their country as well as a measure of economy. The Besser Manufacturing Co. is ready in every way possible to help maintain service to keep Vibrapacs in the best operating condition to do their utmost for war production.

**BESSER
VIBRAPAC**



Undirectional vibration under Flam patents (other patents pending) was employed to make the first vibrated blocks ever produced commercially. The Besser Vibrapac combines undirectional vibration with the exclusive Besser Plain Pallet principle. Users of these machines are fully protected under Besser and Flam patents.

BESSER MANUFACTURING CO.

208 Forty-Second St.

Alpena, Mich.

Complete Equipment for Concrete
Products Plants

THE SAVING IN PALLET COST WILL PAY FOR
A BESSER VIBRAPAC PLAIN PALLET STRIPPER

MERCHANDISING

Marketing Slag As Ready Mix

Cleveland Slag Co. builds modern batching plant as a service in supplying concrete to dealers

UNTIL RECENT YEARS, ready-mixed concrete was comparatively slow to gain widespread acceptance in Cleveland, Ohio. However, during the last three years volume has jumped tremendously, and over 100 ready-mixed concrete trucks are now serving the metropolitan area. All kinds of construction, in addition to war plant building, is being served with ready-mixed concrete.

An important addition to concrete batching capacity was recently contributed by the Cleveland Slag Co., when it completed a new plant to serve transit mix trucks. Primarily a producer of crushed blast furnace slag, this company, as a ready-mixed concrete producer, functions as a service organization to its dealers for slag. Its interest, in providing the facilities to batch concrete, is to render the kind of service its dealers and their customers desire and to provide a means of merchandising slag.

Cleveland Builders Supply Co., largest producer of ready-mixed concrete in Cleveland, is the prime dealer, or exclusive sales agent, for the concrete batched by the Cleveland Slag

Co. Some 30 other dealers also clear orders through this sales organization. Sales activities of the slag concern are confined to production, to put slag across to the engineers and contractors. Sales are closed by the dealers, but the producing company is actively supporting them with test data and information on the properties and advantages of slag concrete. This is particularly the case on large projects such as the plant expansion now under construction by the Re-

public Steel Co., to increase its blast furnace capacity.

Orders for concrete, small and large, are routed by the dealers through the sales company, which is billed for the materials that go into the concrete and which establishes and keeps records of the prices. Under this unusual sales arrangement, about 70,000 cu. yd. of concrete were batched by the Cleveland Slag Co. last year from a plant built years ago to dry batch trucks and later equipped for transit-mixed concrete. However, its capacity was insufficient for 1942 requirements.

The new plant is designed to service truck mixers just as fast as they can be made available. Delivery equipment is owned and operated by the dealers. The plant is known as Dock 6, and serves as a storage and retail distribution yard for the movement of crushed slag.

All coarse aggregate is slag, of course, and the fine aggregate is natural sand obtained from several sources. Sand in the Cleveland area comes from local pits or banks, and lake sand is also used. It is trucked to the plant.

A material-handling system of great flexibility is part of the new plant layout. Materials to be placed in the batching bins are first stockpiled over



Close-up of new ready mixed concrete plant, with tunnel belt conveyor bringing aggregate to elevator



Interior of plant showing batching control equipment for ready mixed concrete



Overall view of ready mixed concrete plant, showing slag storage on left. Elevator to the left is for aggregates; the one to the right for cement. Note bulk cement truck and transit mixer to the right near the old plant

a tunnel conveyor to provide additional live storage and to permit blending of the materials when necessary. Each of four materials is stockpiled in a row over the concrete tunnel. Capacity over the tunnel is 600 tons live total of each aggregate.

Stockpiles are built up either by trucks or from secondary piles, alongside, which are transferred over the tunnel by a locomotive crane. Generally, trucks dump aggregates directly over the tunnel into the cone formed as material is withdrawn from below, and additional material is made available as needed from the secondary storage piles, using the power crane.

Under each stockpile a No. 3 Jeffrey-Traylor vibrating feeder regulates the flow, in reclaiming material on to a 28-in. horizontal belt conveyor, 125-ft. centers, that transfers to a bucket elevator filling the plant bins. Ordinarily two sizes of sand and two of slag are carried in the stockpiles. The most common sizes of slag are $\frac{3}{4}$ - and $1\frac{1}{2}$ -in. As many as three or four sands could be blended on the belt, or several grades of slag. Slag screenings are sometimes stockpiled and blended with sand. The feeder rheostats are set to govern the proportions of the two or more materials to be blended. The plant bins can be filled at the rate of 100 t.p.h., which is the capacity of the bucket elevator.

Heltzel Steel Form and Iron Co. designed and built the new plant. Aggregates are stored in four overhead bin

compartments of 125 tons each. A swiveled chute at the head of the aggregates elevator is turned by the batcher operator from his station by remote control chains to place the aggregates in the proper compartments. Bulk cement is trucked to a small hopper and a cement bucket elevator fills either of two 300-bbl. cement bins. Screw conveyors were provided so that bulk cement cars can be emptied into the same elevator. This is an emergency precaution in the event trucks should become unavailable.

Truck mixers range in size from 2- to 4- cu. yd., and the batcher measures 4-cu. yd. capacity, weighing the batches on a Kron Scale. Screw conveyors from the bottom of either cement bin are started by push button when weighing cement in a separate weigh batcher, which also has a Kron scale. Compressed air is introduced in the cement bin hoppers to induce flow by agitation. The two weigh batchers are dumped simultaneously into a single collecting hopper from which the mixer drums are filled.

Mixing water is withdrawn by gravity from a tank into the truck mixing water tanks, from which the water is accurately measured into the drum at the job site. Steam coils have been installed in the tank for winter heating and the bins are equipped with live steam jets. The policy of filling the truck water tanks for later introduction into the mixers is preferable to mixing in transit, in Cleveland, because so many engineers and inspect-

ors have different ideas and the responsibility is then their own. On some occasions, the drivers are permitted to introduce part of the mixing water into the drums and to mix in transit. The addition of more water to the exact requirement is then made at the job, when mixing is completed.

At both ends of the one-way drive under the batching plant there are water hoses so that a waiting truck can take on water while one ahead of it is being loaded. Batching capacity will only be limited by the capacity for providing aggregates, which is 100 t.p.h., plus the bin capacity. The bins are always filled before starting a day's operation.

On some of the large war-time projects, such as the Republic Steel Co. blast furnace expansion, Pozzolite dispersing agent is added into the mix. It is added from paper bags into the collecting hopper in the ratio of one pound to a sack of cement. Cleveland Slag Co. is a subsidiary of the Standard Slag Co., Youngstown, Ohio, and operates two slag crushing plants in Cleveland. Production from the new ready-mixed concrete plant began June 15.

Busy Ready Mix Plant

THE BECKLEY & MEYERS Co., Springfield, Ohio, has been extremely busy lately. To facilitate handling cement direct from cars or storage, the company recently installed a 30-in. Lamson conveyor, 75-ft. centers.

Material Handling

(Continued from page 102)

ding and delivery, the units are being piled wide apart with plenty of space between to increase the circulation of air. A gasoline-powered Clark Tractor yarms the block. High early strength cement is used in the winter and standard portland in the summer months.

Trucks are hired for heavy movements of block to the big jobs, but the company operates two International trucks, two Macks and an Autocar semi-trailer truck. Chimney block and sash block are the products other than building block which are manufactured. J. P. Collins is superintendent of the plant.

Complete Large Cinder Block Plant

CINDER PRODUCTS, INC., Cincinnati, Ohio, has completed construction of its new plant for the manufacture of both cinder block and gravel concrete block. Capacity of the new plant is 12,500 standard units in 8 hr. Equipment includes two automatic Besser tamper block machines and a concrete brick machine. The company



Above: J. P. Collins, superintendent, explains how units are piled for free air circulation. Below: Showing an assortment of the various types of masonry units manufactured

produced over 1,500,000 standard cinder block alone in 1941 at its old location. Edgar M. Johnson is president of the company and Lee J. Workum is secretary-treasurer.

Marking Concrete Block

CONCRETE PRODUCTS manufacturers very often find it necessary to mark various sizes of concrete block, particularly specialties. Nearly all precast concrete units, such as joists, floor slabs, etc., are marked in some way to identify them by size or job in which they are to be erected. The Markal Co., Chicago, Ill., has developed paint stick marking pencils which are said to be particularly desirable for this purpose. The marks on all surfaces, whether dry or wet and at temperatures ranging from zero to 170 deg. F., will not smear, peel, discolor or run, it is claimed. The paint pencils come in five types, but the "C" type is recommended for marking concrete products. Other types are for hot surfaces or for lumber. There are six brilliant colors to select: red, white, blue, green, yellow, and black.

To Build Tile Plant

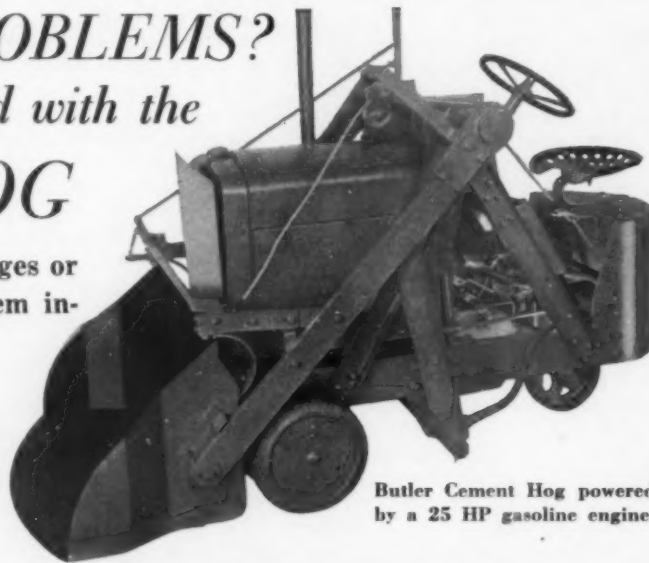
ACCORDING to newspaper reports, a concrete tile plant is to be built near DeSoto, Kan., to manufacture pipe for an industrial plant water line. Eight acres of land have been leased for the purpose.

HANDLING PROBLEMS?

They're easily solved with the
CEMENT HOG

Unloading bulk cement from barges or box cars is often a difficult problem involving slow and costly hand labor. But with the Butler Cement Hog, handling speed may be more than doubled in many cases and badly needed workers may be released for other jobs.

Small, compact, and maneuverable, the machine can turn within the narrow confines of a boxcar, and yet it is capable of unloading 300 barrels of cement per hour. The seventy-five machines already serving America's war



Butler Cement Hog powered by a 25 HP gasoline engine.

effort attest to the job they can do. Investigate its possibilities for *your* plant today.

BUTLER BIN COMPANY

WAUKESHA, WISCONSIN



**conserving steel,
saving transportation,
expediting war jobs**



On many types of war construction, concrete is helping meet four pressing requirements:

STEEL IS CONSERVED. Concrete provides rigid, durable, fire resistant construction with minimum use of steel. Many structures, such as floors on ground, need none. Portland cement water paints save lead and zinc.

TRANSPORTATION SAVED. Concrete imposes a minimum burden on transportation facilities, since the bulk of the material is usually found locally.

TIME SAVED. Simple methods, widely available concrete workers and local materials are helping to expedite jobs.

"WHAT IT TAKES" ASSURED. Strength, rigidity, fire safety, economy of first cost and maintenance are inherent with concrete.

Concrete designers, contractors and products men are rendering valuable service by assisting in efforts to use all these advantages to the fullest where concrete is needed.

PORTLAND CEMENT ASSOCIATION
Dept. 8-45, 33 W. Grand Ave., Chicago, Ill.

JAEGER Motorized CONCRETE PLANTS MEET YOUR PROBLEMS



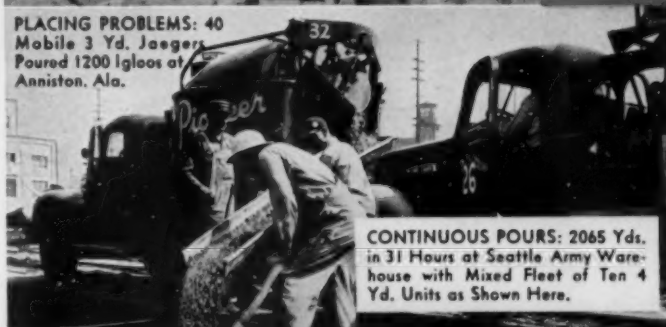
LABOR SCARCITY IN DESERT — 4
"HIGH DUMP" 4 Yd. Units Averaged
Over 120 Cu. Yds. Hourly of Minus
1" Slump on California Bomber Range.

*Most of the
TRUCK MIXERS
now speeding
war work are
JAEGER*



HIGH PRODUCTION: 95,000 Yds.
for Ford Bomber Plant @ 2000
Yds. per 16 Hours — with 10 Jae-
ger "LOW CHARGE" 4 Yd. Units.

PLACING PROBLEMS: 40
Mobile 3 Yd. Jaegers
Poured 1200 Igloos at
Anniston, Ala.



CONTINUOUS POURS: 2065 Yds.
in 31 Hours at Seattle Army Ware-
house with Mixed Fleet of Ten 4
Yd. Units as Shown Here.

Only JAEGER Offers a Type for Every Need

"HIGH DUMP": Top-Loading, with Fast,
Vacuum-Controlled Discharge Door, or
Combination Top-or-End Loading—to meet
conditions, 2 to 8 yd. sizes.



Four 2 Yd. Units did 198 yds.
in a day with this setup at
Linthicum, N. C.

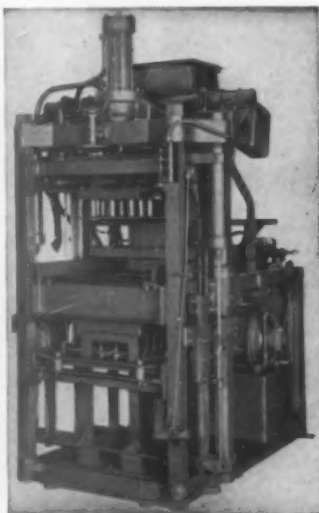


or "LOW CHARGE": Fastest on
market, 2 to 8 yd. sizes. All Jae-
gers have 2-Speed Transmission
(Vacuum-Controlled Truck Engine or
Separate Engine Drive), One-Shot
Loading, Dual-Mix Drum, Fastest
Discharge.

YOU OWE IT TO YOURSELF TO KNOW why more con-
crete is being mixed and placed by Jaeger Truck Mixers.
Agitators than by any other method. **SEND FOR
COMPLETE DATA --- TODAY!**

THE JAEGER MACHINE COMPANY
603 DUBLIN AVE., COLUMBUS, OHIO
World's Largest Manufacturer of Concrete Mixing Equipment —
Pumps, Mixers, Concrete and Bituminous Paving Equipment.

HYDRAULIC VIBRA-PRESS



A High Production Machine
Making Blocks which are
Demanded by the Contractor
Endorsed by the Architect
Desired by the Mason

The KENT MACHINE CO.
CUYAHOGA FALLS, OHIO



Make Both Large and Small Pipe Profitably

UNIVERSAL not only offers an "all-purpose" machine to produce every size of concrete pipe from 6" to 48" but also equipment for larger sizes such as the 135" pipe we have furnished for highway work.

You are assured of getting superior equipment to produce the finest pipe at a profit from UNIVERSAL.

Write today for catalog
and details.

UNIVERSAL
CONCRETE PIPE CO., Inc.
COLUMBUS, OHIO

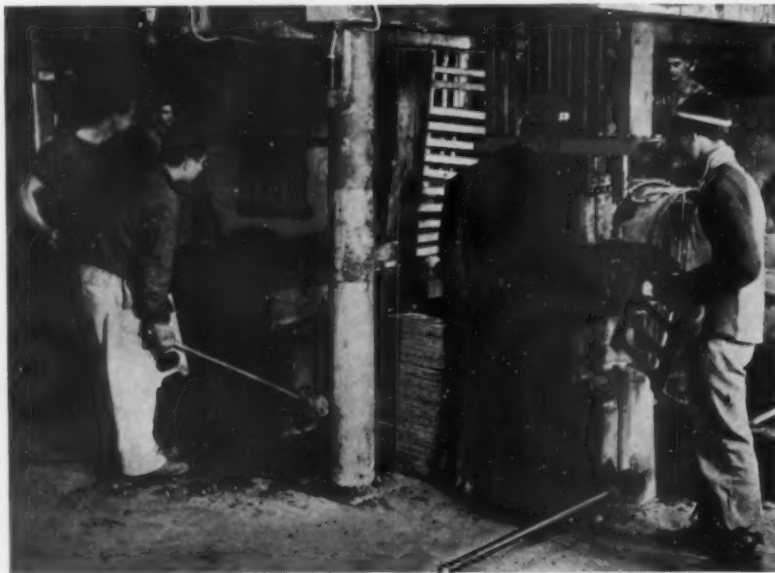
Training Our Youth for the Future

N. Y. A. project supplies employment and experience to future concrete products manufacturers

By E. M. WAGGONER*

IN THE OLD MOLINE PLOW WORKS in Poughkeepsie, N. Y., the National Youth Administration set up a concrete block plant with the two-fold

plant here in Poughkeepsie, we have a sheet metal shop, blacksmith shop, welding shop, automotive shop and woodworking shop. The block plant



Boys are trained in all phases of concrete block manufacture by actual shop experience

purpose of supplying masonry units for nearby federally sponsored, N. Y. A. projects and providing work experience for local youths in an important field where they may later find permanent employment.

In addition to the concrete block

* Area Work Projects Officer, Federal Security Agency, N. Y. A.

was originally established to supply concrete blocks for the construction of buildings of an N. Y. A. resident center. The group of buildings is expected to house some 400 youths who will be receiving work experience in all fields relating to aviation. Other work being done on our various projects is sponsored by local, state and federal agencies such as city boards

Buy
U. S.
Bonds
and
War
Saving
Stamps

OPPORTUNITY REPLACE CRITICAL MATERIALS



PRIORITIES, SHORTAGES AND INCREASING COSTS are rapidly forcing changes in the building industry. Your future may depend upon your ability to overcome and solve these problems. You can profit on these conditions by manufacturing building products out of your surplus or waste aggregate.

WE CAN STILL EQUIP YOU with manufacturing machines enabling you to make permanent, attractive building material in many sizes and wide range of colors. Arrange to supply your building trade with this proven material offering permanent construction at price level of good frame.

WRITE TODAY. Learn about this exclusive opportunity by sending for Free Book.

W. E. DUNN MFG. CO.

23 W. 24th Street

Holland, Michigan

ROCK PRODUCTS

and departments, Taconic State Park Commission, New York State, Boards of Education, and of course the N. Y. A. itself.

Training Equipment

In our entire project, including all the shops mentioned, we have assigned about 175 young men, all residents of Poughkeepsie and vicinity. These young men are employed for a maximum period of 100 hours in 30 days and are paid, out of federal funds, at the rate of \$21 for this 100-hour period. In the block plant we use 14 youths, including machine operators, mixer men and yard men.

Cinders are obtained from the New York Central Railroad and crushed stone screenings from the New York Trap Rock Corp., Stoneco, N. Y. Our products include standard building block, lintels, coping and park benches.

Cinders are conveyed from stock pile in the yard to crusher which discharges to operating floor. A 12-ft. Stearns mixer is charged by hand and serves two Stearns Jr. Strippers, with 8-bar tampers. The green product, handled by a Lewis-Shepard hydraulic lift truck, is air-cured in the room for 48 hours, and then transferred to a ventilated shed.

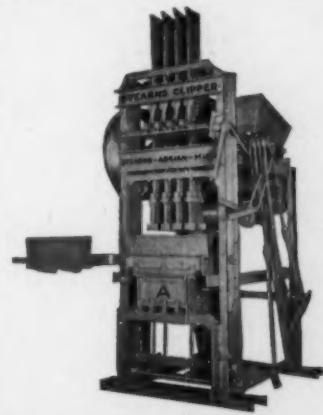
Concrete Block Bins for Granaries

AN EXPERIMENTAL storage bin made of concrete block was built at Hutchinson, Kan., recently as a proposed solution to building granaries without the use of reinforcing steel. To withstand the heavy pressure resulting from the storage of 2300 bu. of wheat, pilasters were used to brace the outside walls. Ordinarily steel would have been used to tie the bin together.

Build Ready Mix Unit

THE DE BOLT CONCRETE CO., Richmond, Ind., recently added a new Rex and a Jaeger mixer mounted on Brockway trucks. Other equipment additions include a Pioneer conveyor, 280-ft. centers, a feeder, and a Simplicity vibrating screen. Mr. De Bolt also has set up a ready mix plant near Greenfield, Ind., to furnish concrete for bridges for the extension and widening of Route 40.

BIBLER VAULT CO., Marvin, Ohio, has bought two other concrete vault companies, one a few miles away and the other in Marvin. New equipment has been purchased to replace that which was lost in a fire.



"ANCHOR"

Complete equipment for making concrete, clinder and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service. Hobbs block machines. Anchor tampers. Anchor Jr. strippers. Stearns power strippers. Stearns Joltcrete. Stearns mixers, pallets, Straublox Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mchy. Co.

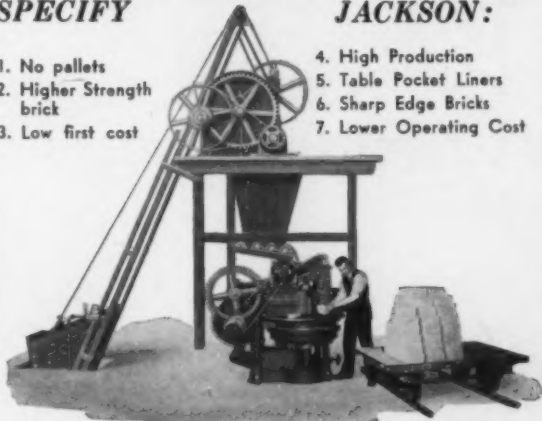
G. M. Friel, Mgr.

Columbus, O.

1 JACKSON BRICK MACHINE = 1 COMPLETE EFFICIENT PLANT

Seven Reasons Why It Will Pay You To SPECIFY JACKSON:

1. No pallets
2. Higher Strength brick
3. Low first cost
4. High Production
5. Table Pocket Liners
6. Sharp Edge Bricks
7. Lower Operating Cost



No other Brick Machine can give you all these advantages. The JACKSON Model A produces up to 28,000 brick per day . . . the Model C up to 14,000 brick per day. Check up on this low-cost profit-making machine now. **WRITE FOR BULLETIN J-42 TODAY.**

JACKSON & CHURCH COMPANY
SAGINAW, MICHIGAN, U.S.A.

... Yet
High Priorities
Plus MULTIPLEX
Service Still
Assure Proper
Upkeep of Your

MULTIPLEX Concrete Machinery

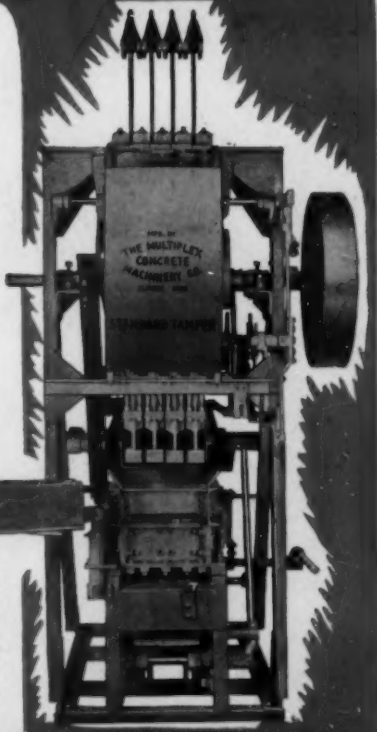
SURE — We're doing everything in our power on straight U.S. War Production.

But . . .

Uncle Sam has provided you with good priorities to enable you to keep your MULTIPLEX machines in good running order.

Even though we are "busy as can be" on war production orders, we are also ready to furnish necessary repairs and replacements on these priorities to keep your MULTIPLEX "ship-shape."

Write or wire us if you need our assistance.



MULTIPLEX CONCRETE MACHINERY

ELMORE, OHIO

Are You Interested In:

- . . . Wet Screening??**
- . . . Froth Flotation??**
- . . . Lubrication and
Maintenance of Portable
Compressors??**
- . . . Removal of Mica from
Clay??**
- . . . Mining Feldspar??**
- . . . Blending Sand
Scientifically??**

Then Read and Advertise in

SEPTEMBER



Rock Products

Featuring **"MISCELLANEOUS
INDUSTRIAL MINERALS"**

There's one thing you can depend on in every issue of ROCK PRODUCTS . . . each issue is "balanced" to contain important, interesting news for every type of plant operator.

Throughout the year, the "balance" of all issues of ROCK PRODUCTS is so perfected that each

phase of operations throughout the entire Rock Products Industries receives its proper proportion of editorial attention.

So in September, when we feature Miscellaneous Industrial Minerals, you'll also find editorial "balance" to cover all phases of the Rock Products field.

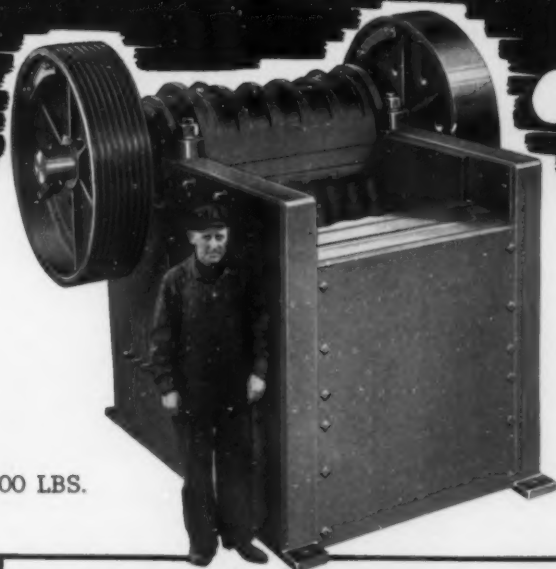
ROCK PRODUCTS . . . 309 W. Jackson Blvd., Chicago

Published by the Trade Press Publishing Corporation

IT WEIGHS

50% less

39,600 LBS.



The new Pioneer 30" x 42" Jaw Crusher weighs less than half as much as some Blake type crushers with the same size opening . . . and the Pioneer Crusher will take larger rocks and produce more capacity.

HERE'S WHY IT WEIGHS LESS



The old crusher had the eccentric in back of the lower end of the moving jaw and was 50% longer, and large and cumbersome.

Cast Iron
22,000 lbs.
Tensile
Strength
Per sq. inch.

The old crusher was made of cast iron which required thick heavy sections. In spite of excess weight no additional strength was added.

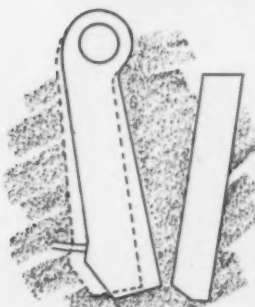


The Pioneer Crusher has the eccentric at the top of the moving jaw and is compact. This feature permits a maximum of compactness.

Steel
60,000 lbs.
Tensile
Strength
Per sq. inch.

The new crusher is plate steel — is welded in box construction with double walls. Here additional strength is readily accomplished.

HERE'S WHY IT WILL TAKE LARGER ROCKS

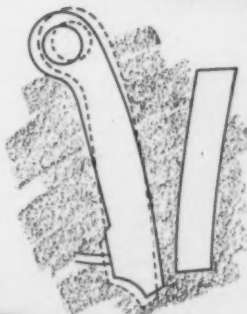


Cut No. 5

The Blake type (see cut No. 5) hinges at the top and rocks will ride on the top opening.

The overhead eccentric (see cut No. 6) is at the top and with a 1 1/4" stroke, it opens the jaw opening, allowing the rock to drop down where the jaws can grab it.

AND HERE'S WHY IT WILL PRODUCE MORE...



Cut No. 6

On the old crusher (see cut No. 5) the action is only at the bottom and gravity feeds the rocks thru.

The overhead eccentric (see cut No. 6) has a downward crushing stroke that forces the rocks thru the crusher — and on the upstroke, the lower edge crushes, giving a double crushing action.



Send for your free copy of our handy reference "Facts and Figures."

Pioneer
ENGINEERING WORKS
Minneapolis, Minnesota, U.S.A.

Lime Kilns Converted from Wood-Firing to Gas

BATESVILLE WHITE LIME CO., Batesville, Ark., is completing major improvements at Limedale, Ark., to increase production to meet war needs. The six kilns in the plant have been converted, for gas-firing to replace wood. Three shift operation is anticipated, with much of the production going to a new aluminum plant.

Rebuild Gravel Plant

IRVING BROS. GRAVEL CO., Marion, Ind., has reopened its Sweetser, Ind., plant, operated as the Pipe Creek Stone Co. after a shutdown to increase its capacity for finer sizes. A surge stockpile is now provided for, between the primary crusher and the plant, to permit continuous crushing and sizing with intermittent quarry operation.

New Quarry Opened for Airport Construction

TOBIN QUARRIES, INC., Kansas City, Mo., has opened a quarry near Herington, Kan., and will produce 2000 to 2500 cu. yd. of crushed stone per day for construction of an army air training field. Forty cars a day will be needed to deliver the stone.

Better Cement Prices On Pacific Coast

HEAVY DEMANDS for cement on the Pacific Coast have been responsible for the arrest of the price declines, particularly in the California area, which have been particularly low. Average first quarter prices in California have risen from a low of \$1.322 per bbl. in 1941 to \$1.509 in 1942. In the Oregon-Washington territory, the low price in 1940 was \$1.74 per bbl., which rose to \$1.861 in 1941 and then to \$1.90 in 1942 for the first quarter.

New General Offices

GRAHAM BROS., INC., Los Angeles, Calif., has moved its offices to 52nd drive in Maywood. Maywood was selected because it is centrally located between the company's supply points and the bulk of the delivery area served. Graham Bros. is one of California's largest producers of sand, gravel and ready-mixed concrete.

To Build Flight Strips Along Concrete Paving

AN APPROPRIATION of \$5,000,000 has been requested by President Roosevelt for the Public Roads Administration for flight strips along high-



ways to be used by airplanes in landing and taking off. The appropriation requested of Congress is reported to be the remaining balance of the \$10,000,000 authorized for the purpose in the defense highway act of 1941. To date, plans and surveys have been authorized for 15 flight strip projects and 149 additional projects are included in the army's tentative program.

Flux Stone May Come Under Wage-Hour Ruling

THE NATIONAL CRUSHED STONE ASSOCIATION has sent out a notice to its membership through J. R. Boyd, Administrative Director, that it expects the federal Wage-Hour division to assume jurisdiction of flux stone workers under an interpretation of the Act on April 20, 1942 by L. Metcalfe Walling, Administrator.

Keystone Wins Minute Man Treasury Banner

IMPRESSIVE ceremonies were held recently at the Keystone Portland Cement Co. plant, Bath, Penn., when the Minute Man banner was raised immediately below the American flag. This banner was awarded to the company in recognition that more than 90 percent of the plant employees are permitting payroll deductions to purchase war bonds and stamps. Howard

Leh, the general operating manager, received the banner in behalf of the employes from Norman A. Peil, chairman of the Northampton county war savings staff. Speakers at the ceremonies were Harold M. Scott, president of Keystone; Norman A. Peil and H. H. Leh. Nineteen men from Keystone are in the service.

Scrap Rubber Around Gravel Plants

OHIO GRAVEL CO., Cincinnati, Ohio, recently delivered 4200 lb. of scrap rubber to a collecting station upon instruction from its president, Fred W. Cornuelle, and donated the \$42 proceeds to the USO. His instructions to managers of his five plants were to "gather up every ounce of rubber not in use or usable," and each plant unearthed nearly 1000 lb.

May Re-Open Agstone Plant

A SURVEY is being made to decide whether the State-owned Yadkin county limestone plant near Elkin, N. C., should be re-opened immediately. The shortage of automobile tires and gasoline has prompted the study, in an attempt to make agricultural limestone available locally without a long haul.

Mining Phosphate in New Florida Location

INTERNATIONAL MINERALS AND CHEMICAL CORP. has started mining operations at its new Peace Valley phosphate project near Mulberry, Fla. Probably 85 percent of the company's phosphate production for the next 10 to 15 years will come from this location, with an estimated annual capacity of 700,000 to 750,000 tons. The washing plant will have flotation for the recovery of fine particles. Workers are to be transported by private buses a distance of 20 miles from Mulberry where the company had built some 200 homes for employees.



Snapshots taken during the ceremonies attending the raising of the Minute Man banner at the Keystone Portland Cement Co. plant

Saving **TIME** *by the* **TON**

MORE APPRECIATED now than ever before, Barber-Greene Conveyors have a unique reputation for saving time as well as money. Most important at the moment is Barber-Greene's competent engineering service, which gives you the most economical layout for your own material handling requirements. B-G Standardized Sectional Construction makes for speed in planning the system, speed in erection, and assures performance as planned.

The production records of your job are dependent on the efficiency of your material handling system. Let us work with you.

41-12

BARBER  **GREENE**
AURORA ILLINOIS

NEW EQUIPMENT

Improved Wagon Drill

INGERSOLL-RAND CO., New York, N. Y., has made several changes in its well-known X-71WD drifter developed for wagon drill service in which



Drifter of improved design with the FM2 wagon drill mounting

the drilling of deep holes is usually required. A positive method of blowing more air through the drill steel permits little air to escape around the sides of the shank.

Light-weight Truck Mixer

THE T. L. SMITH CO., Milwaukee, Wis., has introduced its No. 3 Smith-Mobile which features its comparative light weight for a 3-cu. yd. capacity. It is claimed that this unit mounted on a two-axle truck can carry a full payload and still stay



Light-weight, compact unit has a 3-cu. yd. capacity as a truck mixer

within the stringent load limits imposed by nearly all the states.

Within a 143 cu. ft. drum volume,

the No. 3 has a rating of 3 cu. yd. as a truck mixer and 4 cu. yd. as an agitator. The mixer weighs 5450 lb. complete with separate engine drive and two-compartment water tank.

Saving Vital Metals By Hard Surfacing

WALL-COLMONOY CORP., Detroit, Mich., has made some interesting studies of hard-surfacing high alloy



Showing pug mill knife blades and method of hard-surfacing. Left to right: new pug mill blade, two blades badly worn after only three months' service, and right, the worn blades after they have been built up and hard-surfaced by welding and in service a year

steels to increase the life of vital metals.

In the illustration is shown a new pug mill knife made of high alloy steel and weighing 24 lb. Next to it are two knives showing the results of only three months' service. Over half of the blade material has been worn away. The two knives at the right are made of the same material, high alloy steel, but the blades were covered with a protective coating of Colmonoy No. 6, of which 1½ lb. were welded on each blade. When this picture was taken the hard-surfaced blades had been in service for over a year.

The worn knives shown can be recovered by cutting off the stub blades,

in the replacement of 24 lb. of high alloy steel by approximately 5 lb. of low carbon steel and 1½ lb. of hard-surfacing material.

Electrode for Overhead Welding Work

GENERAL ELECTRIC CO., Schenectady, N. Y., has brought out what has been termed an "all-position, alternating-current electrode, type W-26."

Developed after intensive research, this electrode is said to fulfill the need for a vertical and overhead a-c welding electrode that would give a high-quality job from the standpoint of physical characteristics as well as easy operation, adequate penetration, and practically flat fillet contour.

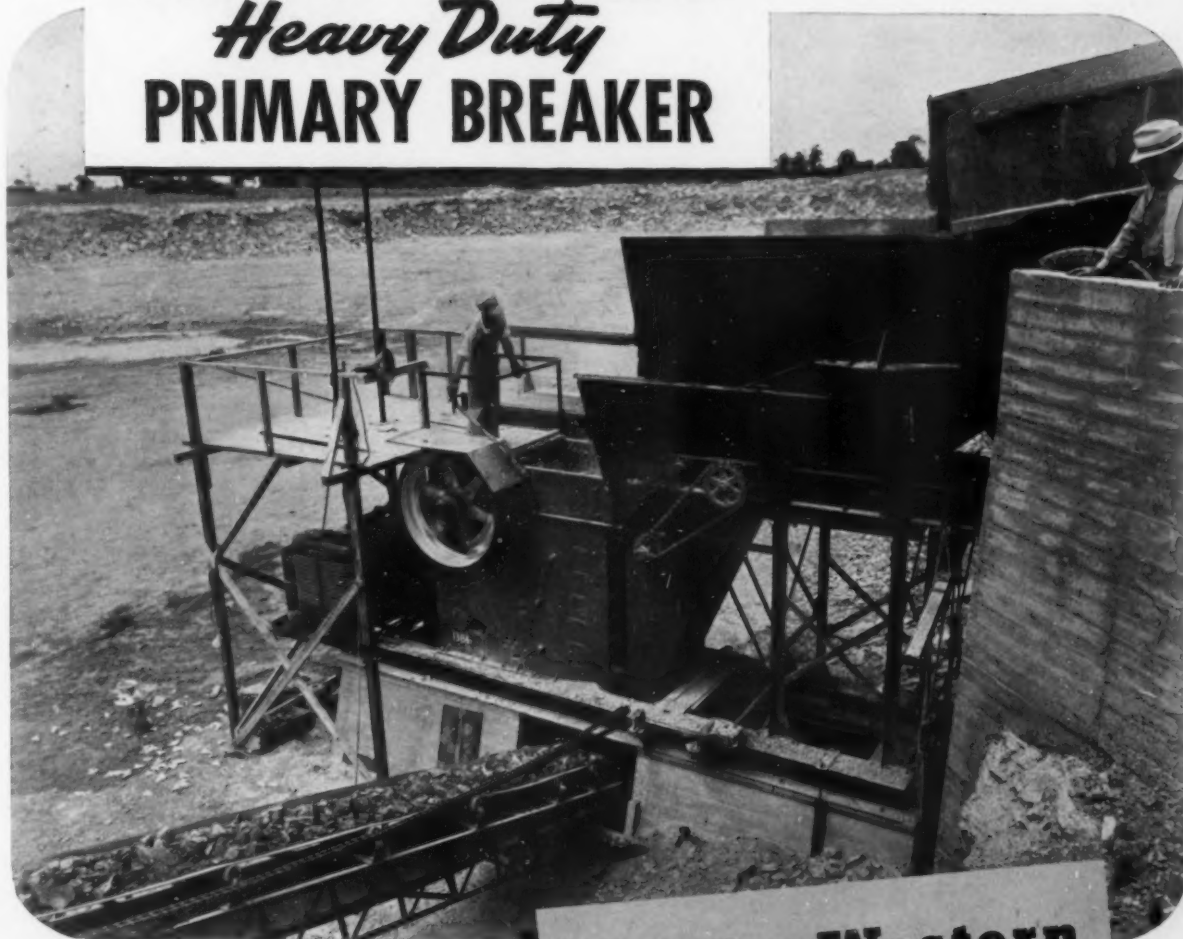
It is now available in ½-in. and 5/32-in. diameters; other sizes from



Welder using the new a-c welding rod in a vertical position

1/16-in. to ¼-in. are expected to be available shortly. Welds made with the 5/32-in. electrode have the following average physical properties: ultimate tensile strength, 72,000 p.s.i.; yield point, 60,000 p.s.i.; elongation in 2 in., 26 percent; and reduction of area, 46 percent.

AUSTIN-WESTERN *Heavy Duty* PRIMARY BREAKER



**Reduces 24" Rock
to 3" Minus**

Austin-Western

● This 2450 Primary Breaker is in operation at a Mid-West quarry, crushing rock for a U. S. Ordnance Plant. Set to produce 4" material, and handling rock up to 24", this unit is delivering 150 to 175 tons of stone per hour on a 3-shift basis.

This latest addition to the A-W line of pit and quarry equipment is an overhead eccentric type crusher. Its eccentric action gives a force feed, which with the speed of operation, provides substantially increased capacity over bulldog or gyratory crushing equipment, as well as enabling it to handle up to 24" material.

Typical A-W heavy duty construction features give assurance of continued high efficiency, low maintenance cost, and extra years of trouble-free service. Jaws are exceptionally deep to provide faster crushing. Shafts are very large, and are equipped with self-aligning roller bearings which require lubrication only after ten hours of operation.

The crusher is equally suitable for use in a stationary set-up or in a portable unit. The breaker weighs 34,000 pounds, and is driven by a 100 H. P. motor. Wheels can be with steel or pneumatic tires. Write for full details.

THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois

MOTOR GRADERS • BLADE GRADERS • ELEVATING GRADERS • SCRAPERS • CRUSHING AND SCREENING PLANTS • ROLLERS
ROLL-A-PLANES • MOTOR SWEEPERS • SHOVELS AND CRANES • SCARIFIERS • DUMP CARS • TRAIL CARS

FINANCIAL NOTES

RECENT DIVIDENDS

Alberene Stone Corp. of Va. Com. (p5).....	.15	July 25
Alpha Portland Cement Co. ....	.25	Sept. 25
Diamond Portland Cement Co. Com. (p1)...	.20	July 20
Dolese & Shepard Co.	1.00	Aug. 1
Eastern Magnesia Talc Co. Com. (p100) ext.	1.50	June 30
Lehigh Portland Cement Co. Q. ....	.37½	Aug. 1
Lehigh Portland Cement Co. pfd.	1.00	Oct. 1
Medusa Portland Cement Co. Com. (np)...	.25	July 6
Monolith Portland Ce-		

ment Co. 8% pfd. (p10) (arrears) .....	.25	July 15
Pacific Portland Cement Co. 6½% pfd. (p100) Acc.	1.00	July 29
Riverside Cement Co. 1st pfd. Q.	1.50	Aug. 1
Schumacher Wall Board Corp. pfd. ....	.50	Aug. 15
Superior Portland Cement Co. B. ....	.50	Aug. 1

NORTH AMERICAN CEMENT CORP., New York, N. Y., showed a net profit of \$150,403 for the twelve months ended

June 30, 1942, after taxes and charges, which compares with a loss of \$127,-382 for a like period in 1941.

SCHUMACHER WALLBOARD CORP., Los Angeles, Calif., has announced the following comparative statement of income for the years ended April 30:

	1942	1941
Gross profits	\$748,936	\$698,803
Selling, etc., expense ..	211,394	201,196
Depreciation	63,807	54,696
Operating profit	473,735	442,911
Other income	1,413	970
Total income	475,148	443,881
Other charges	573	43,377
Fed. income tax	93,277	96,219
Excess prof. tax	121,000	21,000
Net profit	260,297	283,285
Preferred divs.	241,910	85,380
Common divs.	16,500	.....
Surplus for year	1,887	197,905
Previous surplus	341,329	144,024
Surplus, Apr. 30	343,816	341,929
Earn., pfd. share:		
Priority basis	\$9.15	\$9.95
Partic. basis	2.76	3.00
① Earn., com. sh.	2.76	3.00
No. of pfd. shs.	28,460	28,460
No. of com. shs.	66,000	66,000

① On participating basis.

CONSOLIDATED SAND & GRAVEL, LTD., Toronto, Ont., has presented the following income account for the years ended March 31:

	1942	1941
Operating profit	\$130,963	\$144,420
Depreciation & depletion	44,898	72,234
Net oper. profit	86,065	72,186
Other income	8,611	7,744
Total income	94,676	79,930
Inc. & prof. tax	57,421	42,936
Net income	37,256	36,994
Preferred divs.	49,368	34,444
Surplus for year	12,112	2,550
Prev. earn. surp.	12,496	9,946
Earn. surp., 3-31	384	12,496
Earn., pfd. share	\$5.40	\$5.12
① Earn., com. sh.	d 0.16	d 0.19
No. of pfd. shares	6,902	7,229
No. of com. shares	70,000	70,000

① Disregarding preferred arrears.

DIAMOND MAGNESIUM CO. is the name of a recently organized subsidiary of the Diamond Alkali Co., Pittsburgh, Penn. This company has been formed to build and operate a plant in Texas for the manufacture of magnesium.

ALPHA PORTLAND CEMENT CO., Easton, Penn., had the following comparative earnings statements for the twelve months ended June 30:

	1942	1941
Net sales	\$10,393,435	\$8,597,016
Oper. expenses	7,504,343	6,164,328
Depreciation & depletion	995,471	973,967
Operating profit ..	1,893,621	1,458,720
Other income	56,758	82,353
Total income	1,960,379	1,521,073
Income charges ..	33,798	27,107
Fed. income tax ..	① 637,822	412,819
Net profit	1,288,760	1,081,148
Common divs.	1,268,180	955,445
Surplus for per... ..	20,580	125,703

① No liability incurred for excess profits tax.

Eliminate time-outs
for repairs.
Keep maintenance
to a minimum.

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HAULAGE CARS

With PSC Cars on the job, there's no need for frequent time-outs to overhaul. These strong, rugged, durable haulage cars help to increase production—keep vital materials on-the-move continuously in today's three shift production.



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in your files?

PSC

AUTOMATIC AIR
DUMP CAR

PRESSED STEEL CAR CO., INC.

(INDUSTRIAL DIVISION)

PITTSBURGH, PA.



Portable Gravel Plant

CORE & PLANCHE, Baton Rouge, La., contractors and producers of sand and gravel, have just completed the construction of a new portable pumping unit which will be used at various locations in central Louisiana. The unit comprises a 100-hp. Diesel engine direct-connected to an American centrifugal 8-in. pump which is mounted on a semi-trailer built by Kivett & Reel, Inc., Sun, La.

Rock Wool Developments

NATIONAL GYPSUM CO., Buffalo, N. Y., is completing a \$200,000 rehabilitation program covering its three rock wool plants. Included is an addition to the Alexandria, Ind., plant for the manufacture of a new type of product.

Move Sand Plant

WELCH SANDLER SAND CO., Bonner Springs, Kan., is moving its plant to a new location in the same area, near large projects that will be served.

Sand-Lime Brick Production and Shipments

SEVEN active sand-lime block and brick plants reported for June and seven for May (three reports were received too late to be included, therefore statistics for only four plants were published in July).

AVERAGE PRICE FOR JUNE

	Plant Price	Delivered Price
Detroit, Mich. ....	.....	\$16.00
Sebewaing, Mich. ....	.....	.....
Saginaw, Mich.	\$12.00	.....
Grand Rapids, Mich. ....	.....	15.00
Seattle, Wash.	16.50	18.50
St. Louis, Mo. ....	.....	.....
Watertown, Mass.	12.50	13.50

STATISTICS FOR MAY AND JUNE

	*May	**June
Production	2,940,500†	2,884,120
Shipments (rail)	290,000	.....
Shipments (truck)	2,808,140†	2,659,664
Stock on Hand	1,101,520	1,065,331
Unfilled Orders	2,100,000	1,440,000

*Seven plants reporting: incomplete, two not reporting stock on hand and two not reporting unfilled orders.

**Seven plants reporting: incomplete, one not reporting stock on hand and two not reporting unfilled orders.

†Includes double brick.

Concrete Pavement Yardage

AWARDS of concrete pavement for June, 1942, have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During June, 1942
Roads	2,060,495
Streets and Alleys	2,167,485
Airports	11,037,523
Total	15,265,503

A Ball Mill Manufacturer's Views on the Comparative Values of Liner Metals

"From our own observations and the experience gained through many years of operating and building ball mills, we consider that 13% manganese steel is from two to three times as durable as any other metal for ball mill liners operating under normal conditions with mixed ball charges of sizes from 1½" to 4" or even larger. This comparison includes chilled iron, alloy irons, carbon steel and other alloy steels.

"In actual service a 1½" manganese steel liner can be worn down to ½" thickness or even less before it has to be discarded. We have specimens of manganese steel liners in our shop that were worn down to ⅛" thickness without any sign of cracking or breaking. On the other hand, 3½" thick white iron liners have had to be discarded when worn down to 1½" because of breakage which often causes severe damage to the shell of the mill itself unless quickly discovered by the operator."

The writer goes on to state that the thinner the liner can be, the greater the efficiency of the ball mill, by virtue of the increased inside diameter. A mill with white iron liners

44" diameter, grinding 25 tons in 24 hours, could produce 30 tons in the same period if manganese steel liners were used, increasing the diameter to 48".

He also points out the savings in freight, whether the liners are original equipment or for replacement, since a set of manganese steel liners for a No. 44 mill, for example, weighs approximately 3,300 pounds compared to white iron or similar liners weighing 6,700 pounds. Too, the lighter weight liners are obviously easier to fit to the mill and shorter and less costly bolts are required. There is no danger of breaking manganese steel liners by uneven tightening of retaining bolts.

A greater variation in liner designs is possible with manganese steel, because of its strength and ductility, than with white iron and other hard, relatively brittle metals.

These factual comparisons are extracted from the more detailed report of this particular manufacturer contained in our Bulletin 1141-L. It gives other information concerning manganese steel liners, discusses liner design and pictures representative shipments, and will be sent on request.



One of many designs of manganese steel liners—a typical shipment.

Amsco
AMERICAN MANGANESE STEEL DIVISION
OF THE AMERICAN BRASS & FOUNDRY CO.
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO. OFFICES IN PRINCIPAL CITIES

Manganese Steel Castings for shocks and abrasion.
Chromium-Nickel Alloy Castings for heat and corrosion resistance.
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Welding Materials for reclamation and hard-surfacing.

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PORTABLES

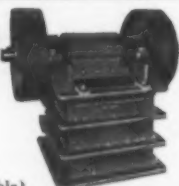
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Bronze or Roller Bearing

Heavy armor plate steel or cast steel.
Heavy Duty Construction
Large capacity
Small power needs
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Self Traveling Tractor

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Ideal for maintenance of Military Access road work



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PORTABLE TWO-IN-ONE LIMESTONE PULVERIZER AND ROCK CRUSHER

Adjustable to Produce Road Rock or Agricultural Lime Dust



BUILT IN EIGHT SIZES

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GRUENDLER CRUSHER & PULVERIZER CO.
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Priorities and Price Regulations

EFFECTIVE July 1, 1942, priorities regulation No. 10 of the War Production Board prescribes a new allocation classification system which must be observed by the rock products industries. An outline of the way the new system will operate appeared in Rock Products, July, 1942, pages 25 and 26. The allocation number for the rock products industry is 8.90 with symbols designating the Army, Navy, domestic producers, etc., as USA, USN, and DP. Two important exceptions involve purchase orders for new buildings which should carry the designation DP-21.10. This classification should be placed by the prime contractor on orders for all items which are actually incorporated in the building itself, such as, plumbing and heating systems. DP-22.00 designates purchase orders issued for materials to be utilized in building repair and maintenance. Purchase orders for materials, such as cement and aggregates, which are incorporated into the products sold, must, in addition to the symbols DP-8.90, show a breakdown as to the class of purchaser and end-use of the product, as obtained from symbols on the purchase orders received.

While all industries eventually will be shifted over to PRP, P-100 will continue to apply to the ready mixed concrete industry using less than \$5000 worth of basic metal in any three-month period. Such companies are not now required to apply under PRP and they are expected to obtain their minimum requirements through use of the regular priority procedures. Therefore the P-100 order, with its blanket A-10 rating, continues to apply to the ready mixed concrete industry, as indicated by Priorities Regulation No. 11. It is believed that the same ruling applies to concrete block and bituminous concrete.

Lift Curb on Building Materials

BY ORDER OF THE WPB, Exemption No. 5, restrictions imposed by Suppliers' Inventory Limitation Order L-63 have been lifted for the following building materials: Portland and natural cement, lime, gypsum and gypsum products, bituminous roofing materials, concrete pipe, cut stone, sand and gravel, crushed stone, clay products, insulation board, acoustical ma-

in POTASH

In this modern Potash plant two 5'x18' Marcy Tube Mills, one 6'x6' and one 8'x6' Marcy Ball Mill are helping speed production of a chemical product now critical to the nation's needs. Thruout the Americas, in Africa and "Down Under," Marcy Mills are contributing to a bigger day's work.

★YOU CAN GET MARCY MILLS for grinding any materials favored by war priorities. Write or wire, stating your specific grinding problem—wet or dry.

Genuine Wilfley Tables, Rock Bit Grinders, Density Controllers, Amalgamators, Belt Feeders, Rubber Pinch Valves, LABORATORY EQUIPMENT, MINE AND MILL SUPPLIES, COMPLETE MILLING PLANTS.

MARCY Ball, Rod & Tube Mills are built in types and sizes to meet ANY requirements.

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CANADIAN
VICKERS, LTD.
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terials, mineral wool, paving materials, concrete products, glass, lumber, wooden mill work.

Clarify Building Order

A SERIES OF INTERPRETATIONS of conservation order L-41 has been made by the WPB. The order made it necessary for builders to obtain authorization from WPB to begin residential construction costing \$500 or more; agricultural construction costing \$1000 or more; or commercial and other construction costing \$5000 or more in any continuous 12-month period. It has been ruled that construction authorized by WPB does not have to be included in the cost quota allowed in the order. For example an owner specifically authorized by WPB to remodel an industrial plant, may still spend, in addition, up to \$5000.

Limits New Construction

CERTAIN RESTRICTIONS have been set up by the Army governing new construction to conserve materials and labor for production of combat equipment.

Standards approved by the Secretary of War, the Secretary of Navy, and the War Production Board, require for authorization of all new construction whether financed by government or by private funds that it be established: (1) that it is essential to the war effort; (2) that postponement of construction would be detrimental to the war effort; (3) that it is not practicable to rent or convert existing facilities; (4) that the construction

will not result in duplication or unnecessary expansion of existing or future plant facilities; (5) that all non-essential parts have been eliminated, and that the structure is of the simplest type, utilizing the most plentiful materials; (6) that there are sufficient labor and materials to build; sufficient public utilities to provide service; sufficient transportation and labor to man the project; and sufficient raw materials to keep the plant in operation.

All field data and engineering research regarding buildings, tools, equipment and management of the

War Department will be correlated in the Facilities Branch, Resources Division of the Services of Supply.

Limit Quartz Crystals

AN ORDER has been issued by WPB which lists the only purposes for which quartz crystals may be used. They may only be used in implements of war for the Army, Navy, lend-lease or government agencies, and in oscillators and filters for use in radio systems operated by federal agencies for commercial airlines and in telephone resonators.

SAVE STEEL FOR SHIPS AND SHELLS

— The —

**More Service You Can
Get Out of Your Wire Ropes,
the More Steel You Save for
Other Vital Uses**

In the interest of our present National Emergency, we offer the following suggestions:

1. Keep your wire rope using equipment in good condition. Sheaves should be of proper size, design, material — and free from corrugations. Keep all sheaves and idlers properly lubricated and in line. Avoid excessive fleet angles.
2. Keep your wire rope thoroughly and correctly lubricated.
3. Avoid kinks and sudden jerks . . . also, avoid cross-winding on drums, and reverse bends if possible.
4. Make sure your wire ropes operate with an adequate factor of safety. If there is not a proper ratio between the strength of the rope and the maximum load to be handled, the rope may be overstressed — a condition no rope can long survive.
5. Use wire rope of the correct size, construction, type and grade for your particular conditions.

The foregoing suggestions are necessarily brief. We shall be glad to give further particulars to any one interested

COMING CONVENTIONS

**American Institute of
Mining Engineers, Industrial
Minerals Division, Bethle-
hem, Penn., October 22 to 24.**

**National Crushed
Stone Association, Hollen-
den Hotel, Cleveland, Ohio,
January 25 to 27, 1943.**

**National Sand and
Gravel Association, Board of
Directors, Hotel New Yorker,
New York, N. Y., October 1
and 2, 1942.**

**National Sand and
Gravel Association, Hotel
Statler, Cleveland, Ohio,
January 27 to 29, 1943.**

**National Ready
Mixed Concrete Association,
Hotel Statler, Cleveland,
Ohio, January 27 to 29, 1943.**

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WIRE ROPE MAKERS
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Fluorspar Ceiling

PERMISSION has been granted by the OPA to the Fluorspar Processing Co., Colorado Springs, Colo., to sell its glass-grade fluorspar at a maximum price of \$27.40 a ton, f.o.b., Salida, Colo. This is the same maximum price previously authorized for the company's sale of acid grade fluorspar.

Welding Rod Restrictions

DISTRIBUTION of welding rods and electrodes has been placed under strict control by an order of the Director of Industry Operations, WPB.

Under Limitation Order L-146, welding rods and electrodes may be delivered without restrictions only to the Army and Navy, specified Government agencies, governments of the United Nations for operations under the Lend-Lease program, and to accredited schools training welding operators. Other deliveries of ordinary rods and electrodes are confined to orders bearing a preference rating of A-9 or higher. In the case of alloy electrodes or rods, which mean ferrous-base electrodes or rods whose core wire contains more than two percent by weight of materials other

than iron or carbon, deliveries may not be made except on orders of A-1-J or higher. The order also provides for the setting aside each month, for repair and maintenance purposes only, 6 percent of each type of rod or electrode delivered by a manufacturer during that month.

Curb Asphalt Use

FURTHER RESTRICTIONS on the use of asphalt and road oil have been ordered by the Office of Petroleum Coordinator, effective July 2. These restrictions cover Districts 1, 2, and 3, involving the following states:

"(a) The States of Connecticut, Delaware, Florida east of the Apalachicola River, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, West Virginia, and the D. C.

"(b) The States of Alabama, Arkansas, Florida west of the Apalachicola River, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee, Texas, and Wisconsin."

These restrictions, under sections 1508.44, 1508.45, 1508.46, 1508.47, 1508.48, provide that all state highways commissions, and all other federal, municipal, county and other government agencies must secure authority from the Public Roads Administration for the use of these materials, proving that the construction and repair of the highway is necessary to the successful prosecution of the war. Airports and airplane plant surfaces are excepted from the ruling. Asphalt and road oil must be transported in tank trucks for distances 200 miles or less unless such transportation is unobtainable.

Nonhighway Gasoline Users Get "E," "R" Books

UNDER the permanent gasoline rationing plan which the OPA put into effect on the East Coast on July 15, all gasoline for occupational non-highway purposes, including commercial boats, is rationed through "E" and "R" coupon books which will provide for a six-month supply. Sufficient coupon books will be issued, depending upon the amount of gasoline for which need can be established during this period. An "E" book will contain 48 coupons with an exchange value of one gallon each, and an "R" book will have 96 coupons with an exchange value of five gallons each. In addition, bulk purchase coupons in 100-

DON'T DELAY WASHING OPERATIONS

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In designing Eagle Washers, our Engineers considered the hard wear that Eagle Washers must withstand . . . and made sure that all parts used were the *best*.

That is why Timken Roller Thrust Bearings are used in the housing, at upper end of tub, which takes all the end thrust of a screw shaft.

. . . why all Flights are made from a special steel and the metal is deeply chilled on surface to insure long wear.

. . . why bronze sleeves are pressed on lower end of shaft, to eliminate rust accumulation and prolong shaft life.

. . . why all Drive Gears and pinions are steel, cut on precision machines, to insure easy running and full power transmission.

Our Engineers are *ready* and *waiting* to assist you at all times.

Our Service Department is anxious to furnish you with genuine Eagle Repair Parts and we will give you as prompt delivery as possible.

Eagle Products include Spiral Screw Washers, Paddle Type Log Washers, Sand Tanks, Sand Drags, Sand Dewaterers, Shale Removers, Sand and Gravel Crushers, Swintek Screen Nozzle Ladders.

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TO WIN THIS WAR, more and more billions are needed and needed fast—AT LEAST A BILLION DOLLARS A MONTH IN WAR BOND SALES ALONE!

This means a *minimum* of 10 percent of the gross pay roll invested in War Bonds in every plant, office, firm, and factory in the land.

Best and quickest way to raise this money—and at the same time to “brake” inflation—is by stepping up the Pay-Roll War Savings Plan, having every company offer every worker the chance to buy MORE BONDS.

Truly, in this War of Survival, VICTORY BEGINS AT THE PAY WINDOW.

If your firm has already installed the

Pay-Roll War Savings Plan, *now is the time—*

1. To secure wider employee participation.
2. To encourage employees to increase the amount of their allotments for Bonds, to an average of at least 10 percent of earnings—because “token” payments will not win this war any more than “token” resistance will keep the enemy from our shores, our homes.

If your firm has not already installed the Pay-Roll War Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write, wire, or phone: War Savings Staff, Section E, Treasury Department, 709 Twelfth Street NW., Washington, D. C.



U. S. War Savings Bonds

This space is a contribution to America's all-out war program by

ROCK PRODUCTS

gal. and 1-gal. denominations may be issued when the ration totals 250 gal. or more a month. The bulk coupons are for those who store gasoline in tanks.

TO PREVENT users of gasoline on the borders of the restricted eastern states area from driving into the adjacent territory without restrictions, the OPA has set up a complete 50-mile border zone. In this zone, gasoline users from the rationed area will not be able to buy gasoline, either for their cars or any other purpose.

Approve Screen Standards

ANNOUNCEMENT has been made by the National Bureau of Standards, Division of Simplified Practice, that a revision of Simplified Practice Recommendation R147-33, Wire Diameters for Mineral Aggregate Production Screens, has been approved by the industry. The revision will be identified by the number R147-42.

This recommendation lists the wire sizes recommended for the construction of mineral aggregate production screens in sizes of clear square open-

ing ranging from $\frac{1}{8}$ - to $\frac{1}{4}$ -in. The original recommendation, drafted by a general conference of all interests in 1932, reduced the variety of wire diameters for openings ranging from $\frac{1}{8}$ to 3 in., by approximately 75 percent of their former number. The recommendation was reaffirmed in 1936, and again in 1940. The revised schedule adds wire diameters for openings in the range from 3 to 4 in., but adds only one new wire diameter, i.e., one inch, to those already listed.

Amend Asbestos Order

TO CONSERVE imported South African amosite asbestos for essential military purposes, the WPB amended conservation order M-79 to provide that 85 percent magnesia pipe coverings containing any type of asbestos may not be used except by specific authorization of the Director of Industry Operations, or in installations where temperatures of 212 deg. F. or higher occur, in ships, or in underground installations.

Phosphate WPB Ruling

AN AMENDMENT has been made to general inventory order M-149, WPB, section 1224.1, providing that notwithstanding any other regulation, any primary producer may make deliveries of phosphate rock, and any person may accept deliveries of phosphate rock from a primary producer, although the inventory of phosphate rock in the hands of a person accepting such delivery is or will be in excess of a practicable working minimum.

Find Domestic Source of Flint Pebbles

THE RICHARD L. CAWOOD Co., East Liverpool, Ohio, reports that their plant facilities have been doubled for the processing of flint pebbles for grinding. It is claimed that these pebbles, which are found in beds of a red, clay-like matrix, are equal to the French pebbles formerly imported. These pebbles are ball milled and washed and then classified for size and selected for quality.

Buys Second Quarry

J. Y. WELBORN, JR., owner of the Welborn Stone Co., Evansville, Ind., recently purchased the Hansbarger Stone Co., West Franklin, Ind., which is near the Welborn property. This company reports an active demand from war projects for crushed stone and a heavy local demand for agricultural limestone.



Regardless of material or operating conditions, Deister PLAT-O Vibrating Screens will set the pace for your production schedules. They will do your screening job with speed, accuracy, economy and dependability because PLAT-O Screens are the product of specialists . . . men whose every working hour is devoted to building and improving separating and sizing equipment exclusively . . . men who have made an intensive study of the problems you face day after day.

makes use of the entire screen surface . . . assures fast, accurate separation. Powerful, positive high speed prevents deadening of throw, overloading and blinding. Simple design, rugged construction and low power requirements reduce operating and upkeep cost. Fully cushioned vibration prevents damage to supporting structure and allied equipment. These are facts . . . proven on the job. Specify PLAT-O Vibrating Screens for your plant and see Machine Company, Fort Wayne, Indiana.

DEISTER MACHINE COMPANY
Ft. Wayne, Ind.






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It's a waste of vital steel to use standard weight pipe when Naylor light-weight pipe can do the job. Naylor's exclusive Lockseam Spiralweld creates a reinforced pipe so strong, leak-tight and safe that it can be used on jobs usually requiring heavier-wall pipe. This saves vital steel—at a substantial saving in costs to you. And no other light-weight pipe can match Naylor's performance advantages.

That's why mining engineers specify Naylor for pipe replacements. Sizes from 4" to 30" in diameter. All types of fittings, connections and fabrication.

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Naylor Light-Weight Pipe is ideal for air lines, de-watering pipe, hydraulic mining, ventilating pipe, high and low pressure water lines, diesel intake and exhaust lines, dredging pipe, sand and gravel conveying lines.

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Gypsum Advisory Committee, W.P.B.

MEMBERS of the gypsum industry advisory committee, W.P.B. are as follows: John C. Best, National Gypsum Co., Buffalo, N. Y.; H. E. Chism, Texas Cement Plaster Co., Oklahoma City, Okla.; F. G. Ebsary, The Ebsary Gypsum Co., New York, N. Y.; Gordon C. Estes, Certain-Teed Products Corporation, Chicago, Ill.; W. L. Keady, U. S. Gypsum Co., Chicago, Ill.; W. H. Kellogg, Jr., The Connecticut Adamant Plaster Co., New Ha-

ven, Conn.; James Leenhouts, Grand Rapids Plaster Co., Grand Rapids, Mich.; Ezra Sensibar, Cardiff Gypsum Co., Chicago, Ill.; Vincent S. Villard, Newark Plaster Co., New York, N. Y.; Martin Uldall, Pacific Portland Cement Co., San Francisco, Calif.

Wins Navy Honor

THE UNION WIRE ROPE CORPORATION, Kansas City, Mo., recently was awarded the Naval "E" burgee for excellence in the war effort. Rear Admiral W. C. Watts presented the blue

banner to M. G. Ensinger, president of the corporation, and John Haglein, the oldest employe, accepted the "E" buttons for other employes.

Heat-Resistant Steel Alloys

TO CONSERVE nickel and chromium, the use of heat-resistant steel alloys was scaled down to a war-time basis on July 3. Order M-21-g of the Director of Industry Operations, WPB, sets up maximum specifications for heat-resistant alloys used in cement kilns, metallurgical furnaces, oil refineries, synthetic rubber plants, and power plants. The new specifications are designed to use the least possible amount of alloying materials.

Defer Cinder Products Meeting

ANNOUNCEMENT has been made by the National Cinder Concrete Products Association that no general meeting will be held this summer. The officers of the association decided to defer the meeting this year due to the war, and that in its place a number of regional meetings will be held at strategic points over the United States.

St. Louis Gravel Ban Under Study

PRESIDENTS of three St. Louis sand and gravel companies recently appeared before Governor Forrest C. Donnell at Jefferson City, Mo., regarding the ban placed on Missouri gravel two years ago for concrete highway construction. According to newspaper reports, G. Locke Tarlton, president of the Missouri-Illinois Material Co., claimed he had been approached to make a \$5000 political contribution that might have lifted the suspension.

The three concerns had an engineering firm make a study of the Meramec river gravels in question, which resulted in a report that no reason was found to eliminate the gravel from consideration. The governor arranged a conference between Tarlton, Otto S. Conrades, president of the St. Louis Material and Supply Co. and Edmond Koeln, president of the St. Louis Materials and Supply Co., with F. V. Reagel, head of the highway testing bureau to discuss the possibilities of returning these gravels to the approved list.

Mica Restrictions

CONSERVATION Order M-101 has been amended to further restrict the use of strategic mica (muscovite or phlogopite block mica).

When You Buy a Crusher What Should You REALLY Buy?



DIAMOND Standard Jaw Crushers are made in 13 sizes from 6" x 12" to 24" x 36" and Roll Crushers in 6 sizes from 16" x 16" to 54" x 24", and various sizes of these are used in stationary or portable quarry plants and crushing units.

These are the things you should look for and expect in the crusher you buy:

1. A base heavy, rugged and properly reinforced to withstand the hardest crushing operations.
2. Pitman and plates (or rolls) carefully made of suitably hard material to give long and satisfactory use.
3. Proper balance for easiest running and consequent economy of power.
4. Delivery of full capacity.
5. Construction primarily based on the hardest type of crushing.

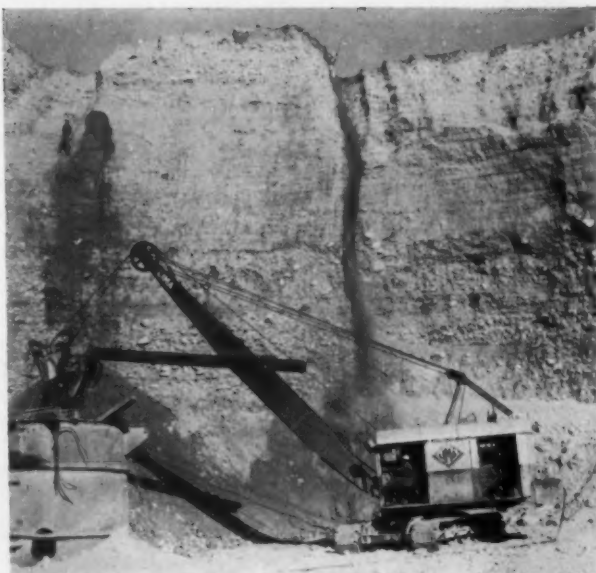
Don't buy on claims unless those claims can be thoroughly backed by performance records. And speaking of records, DIAMOND has some recent and very outstanding ones we're anxious to talk about. Either we, or any of our dealers will tell you all about it. In fact, we'd like to consult with you on any crushing, screening, conveying or elevating problem you have.

WRITE US or contact our nearest dealer for full details of DIAMOND ROCK, SAND AND GRAVEL EQUIPMENT. Free bulletins on request.



LIMA SHOVELS, CRANES AND DRAGLINES ARE BUILT FOR LONG, PROFITABLE LIFE

You who have a LIMA shovel, dragline, or crane are fortunate in having a machine that is built to serve its owner throughout a long, profitable life, but regardless of how good a machine is, it requires normal servicing. Today when it is difficult to get new equipment, because of war work, it becomes definitely important that you give your present equipment proper care. Inspect your machine daily, check all points of lubrication and keep every part in proper adjustment. By so doing, you will help prolong the life of your present shovel, dragline or crane until such time when it will be possible to get a new LIMA without delay.



	Capacities
Shovels	3/4 yard to 3 1/2 yards
Draglines	Variable
Cranes	13 tons to 65 tons

LIMA LOCOMOTIVE WORKS, INCORPORATED

SHOVEL AND CRANE DIVISION LIMA, OHIO

**"WE HAVE USED THIS BUCKET FOR 2 1/2 YEARS
AND RECOMMEND IT TO ANYONE WHO DEMANDS
STEADY AND MAXIMUM PRODUCTION."**

THE CITY EXCAVATING CO.

"We have long since realized," writes A. J. Carlizzi, president of The City Excavating Co., Cleveland, Ohio, "that your 1/2 yard Multiple Rope Bucket gives us far better service than any other make previously used, and we have used several other makes of buckets."

Williams Buckets are truly "built to last and move dirt fast". Each type we build has numerous features which have been developed by over 35 years of bucket engineering for contractors, dredging companies and steel mills. Always a leader in welded design, Williams Buckets now feature welded construction at vital points, using rivets only at certain sections where ultimate replacement may be required. Make your next bucket a Williams!

WELDED
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THE WELLMAN ENGINEERING CO.
7023 Central Ave. • Cleveland, Ohio

WILLIAMS *Buckets*
built by **WELLMAN**

TRAFFIC NEWS

Recent Rate Changes

Following are the latest proposed changes in freight rates up to and including the week of July 11

Central

70623. Sand and gravel, C. L. Establish on, from Riverton, Ind., to Illiopolis, Ill., 111c per net ton, via I. C. R. R., Decatur, Ill., Wab. R. R. and via I. C. R. R., Decatur, Ill., I. T. R. R., subject to Ex Parte 148 increase.

70702. Sand (industrial) and gravel in

open top cars, C. L. Establish on, from Gosport, Ind., to Newberry, Ind., 90c per net ton, via C. I. & L. Ry., Clay City, Ind., N. Y. C. (C), subject to Ex Parte 148 increase.

70703. Sand (industrial) and gravel, in open top cars, Establish on, from Gosport, Ind., to Odon, Ind., 65c per net ton, via C. I. & L. Ry., Bedford, C. M. St. P. & P.,

subject to Ex Parte 148 increase.

70709. Lime, common, hydrated, quick or slaked. Amend individual lines' tariffs naming rates on, from pts. in C. F. A. territory to pts. in C. F. A. and pts. east of the W. T. of E. T. L., by providing for elimination of reference to Agent Jones' Billing Book 470-B therefrom.

70711. Sand and gravel, C. L. Revise rates on, from Silica, O., to pts. in Ill., Ind., Penn., Mich., N. Y., Ky., W. Va. and Ohio, as below:

(Rates in cents per ton of 2000 lb. to following destinations):

Anderson, Ill.	218
Chicago, Ill.	242
East Chicago, Ind. (Chicago, Ill., rates)	242
Evansville, Ind.	327
Erle, Penn.	230
Gary, Ind. (Chicago, Ill., rates)	242
Grand Rapids, Mich.	206
Hammond, Ind. (Chicago, Ill., rates)	242
Indianapolis, Ind.	242
Jeffersonville, Ind. (Louisville, Ky., rates)	278
Lima, N. Y.	303
Muncie, Ind.	206
Newport, Ky. (Cincinnati, O., Interstate Rate)	230
Paducah, Ky.	375
Parkersburg, W. Va.	254
Peru, Ind.	206
Pittsburgh, Penn.	254
Pontiac, Mich.	169
River Rouge, Mich. (Detroit, Mich., rates)	145
South Rockwood, Mich. (No rates required)	
Wheeling, W. Va.	230

70728. Sand, etc., as described in Item 200 of C. F. A. L. Trf. 575-A, as amended. Establish on, from origins shown in Coalton group as per Note 1 of C. F. A. L. Trf. 575-A as amended, to Jenkins, Ky. (a) 209c; (b) 230c; (c) 187c per net ton subject to Ex Parte 148 increase.

Sand, ground or pulverized, C. L., minimum weight 90 per cent of the marked capacity of car, except when car is loaded to full cubical or visible capacity actual weight will apply.

71096. Sand (all kinds) and gravel, in open top cars, C. L. Establish on, from Akron, O., to Lordstown, O., 66c per net ton, subject to Ex Parte 148 increase.

71155. Stone, crushed, slag or gravel, coated with oil, tar or asphaltum (See Note A), in open top cars, C. L. Establish on, from Grand Rapids, Mich., to Bayonne, N. J., Hartford, Conn., Mt. Vernon, N. Y., New Britain, New Haven, Conn., New York, Peekskill, N. Y., 484c; Rochester, N. Y., 352c; White Plains, Yonkers, N. Y., 484c, and Pittsburgh, Penn., 345c per net ton, subject to 6 percent increase under Ex Parte 148 (See Note 7).

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Note 4—Reason. No present or prospective movement.

Note 5—Reason: Comparable with rates from other origins in immediate vicinity.

Note 6—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

Note 7—The oil, tar or asphaltum not to exceed 10% of weight of the commodity shipped, the shipper to so certify on shipping order or bill of lading.



COLMONOY SAVES VITAL METALS

The Pug Knives shown above tell a graphic story of the unusual wear resisting qualities of COLMONOY hard-surfacing alloys and overlay metals.

1. New, 24 lb. pug knife, made of high alloy steel.
- 2 and 3. Same type, after only 3 months of service. Worn beyond efficient operation, with loss of over half of blade material.
- 4 and 5. Same type. Each blade coated with 1½ lbs. of COLMONOY No. 6. In constant use for over a year, and still operating efficiently.

COLMONOY alloys are playing a vital part in the Rock Products industry. Use them on parts subject to great wear—drag buckets, dipper teeth, hand shovels, conveyor screws, gudgeons, pulverizing hammers, clinker plows and other parts that have tough going.

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Other branches in Canada

COLMONOY

Hard Surfacing Alloys and Overlay Metals

70815. Stone, fluxing, furnace or foundry, melting or refractory, unburnt, in bulk in open top cars, C. L. (See Note 3). Establish on, from McVittys, O., to Toledo, O., 72c per gross ton, applicable only on traffic trans-shipped via lake from Toledo, O., subject to increase as per Master Trf. X-148.

Route—Via N. Y. C. (C) Berwick, O.; N. Y. C. (W.).

70816. Slag, granulated (the product of iron and steel furnaces), in bulk, in open top equipment, C. L. (See Note 3). Establish on, from Pittsburgh, Penn., to Charleston, W. Va., 200c per net ton, via available routes, subject to Ex Parte 148 increase.

70817. Slag, commercial crushed, and slag, other than commercial crushed, in bulk, in open top equipment, C. L. Establish on, (Rates in cents per net ton) *Proposed Rate from Pittsburgh, Penn., Junction Transfer, Penn., Allegheny, (Pgh. North Side), Penn., to—Charleston, W. Va., 209; Point Pleasant, W. Va., 193; Kenova, W. Va., 209. *Proposed Rate from Bessemer, Penn., to—Charleston, W. Va., 209; Point Pleasant, W. Va., 193; Kenova, W. Va., 209. *Proposed Rate from Rankin, Penn., to—Charleston, W. Va., 209; Point Pleasant, W. Va., 193; Kenova, W. Va., 209.

*Subject to Ex Parte 148 increase.

70821. Lime, common, hydrated, quick or slaked, in bags, barrels, casks, iron drums, or in bulk, C. L. Establish on, from Mosher, Ste. Genevieve, Hannibal, Mo., Quincy and Marblehead, Ill., to various points in Penn., rates as shown below:

Proposed rates in cents per 100 lb. from Mosher and Ste. Genevieve, Mo., to Sharpsburg, Valencia, Brackenridge, Natrona, Edri, East Pittsburgh, Trafford and Murraysville, Penn., 25c minimum weights 30,000 lb., and 50c for 50,000 lb. minimum weights.

From Hannibal, Mo., Quincy and Marblehead, Ill., to Sharpsburg, Aspinville, Springdale, Elwood City, Creighton, Tarantum, Brackenridge, Natrona, Edri, Trafford, Irwin, Jeanette and Mercer, Penn., 25c and 20c for 30,000 lb. and 50,000 lb. minimum weights, respectively.

70923. Crushed stone, in box cars or in closed equipment. Cancel present rate of 111c per net ton on, from Joliet, Ill., to South Bend, Ind., and to establish in lieu thereof a rate of 143c per net ton on crushed stone, in box cars or in closed equipment, min. wt. 60,000 lb.

70925. Moulding sand. Amend Sou. Ry. Trf. 900-C, as well as agency tariffs issued by B. T. Jones, by publishing therein rates on, from Evansville and Ohio Valley Ry. stations to pts. in Official territory, also to points in W. T. L. territory, 10c per ton of 2000 lb. higher than the existing rates.

70942. Crushed stone, in bulk, in open top cars only; crushed stone screenings, in bulk, in open top cars only; tailings, in bulk, in open top cars only, C. L. Establish on, from Bluffton, Ind., to New Haven, Ind., 55c per net ton.

70946. Stone, crushed; stone screenings, in open top cars, straight or mixed C. L. Establish on, from Bloomville, O., to Marion, O., 66c per net ton, via P. R. R. direct.

70953. Stone, crushed, in bulk, in open top cars; and stone screenings, in bulk, in open top cars, C. L. Establish on, from Bloomville, O., to Ottawa Lake, Mich., 107c; Adrian, Mich., 112c; Clinton, Mich., 118c; Manchester, Mich., 123c, and Jackson, Mich., 129c per net ton, subject to Ex Parte 148 increases.

70772. (a) Sand (except sand, moulding, bonded (naturally or otherwise), and except ground or pulverized), and gravel, in open top cars, without tarpaulin or other protective covering; (b) sand, moulding, bonded (naturally or otherwise) in all kinds of equipment; sand (except sand, moulding, bonded (naturally or otherwise) and except ground or pulverized), and gravel, in

Prevent BURN-OUTS at both KILN-ENDS

The use of PYRASTEEL Kiln Ends is not by any means confined to the discharge end.

Such high temperatures are frequently encountered at the feed end of the kiln, as to make the use of

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the most practical method of preventing burnouts and interrupted operations.

There are many PYRASTEEL installations on the feed end and on the discharge end of rotary kilns . . . also where both the feed and discharge ends are provided with PYRASTEEL Segments. All are giving satisfactory results.

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THE PATENTED DESIGN
IS EXCLUSIVE AND DIFFERENT.

Screen Equipment Co.
LAFAYETTE, PA. BUFFALO, N. Y.

closed equipment, C. L. Establish on, from Chardon, O., to Port Colborne, Ont., (a) 286, (b) 308; Sorel, Que., (a) 688, (b) 710, being proposed rates in cents per net ton, subject to tariff of increased rates and charges X-148. Routing: Rates to apply only via Buffalo, N. Y., gateway.

70937. Stone, crushed, in bulk; stone screenings, C. L. Establish on, (a) from Thornton, Ill., Greencastle, Limerdale, Ramona and Spencer, Ind., to points in Ind. rates as shown below and (b) from Milltown and Marengo, Ind., to Evansville, Ind., 99c and Princeton, Ind., 97c per net ton.

(Rates in cents per net ton)

To Representative Stations—	(1)	(2)	(3)
Cynthiana, Ind.	124	116	113
Edison, Ind.	105	...	...
Evansville, Ind.	124	116	113
		*113	...
Ft. Branch, Ind.	124	116	113
Gravel Pit, Ind.	110	...	...
Haubstadt, Ind.	124	116	113
Hazleton, Ind.	124	116	105
Ingle, Ind.	124	116	113
King, Ind.	124	116	113
Miller, Ind.	124	116	110
Mounts, Ind.	124	116	113
Owensville, Ind.	124	116	113
Poseyville, Ind.	124	116	113
Princeton, Ind.	124	116	110
Purcell, Ind.	124	116	105
Smith, Ind.	110	...	...
Straight Line Pct., Ind.	*113	...	...
Vincennes, Ind.	110	...	...

(1) Proposed rates from Thornton, Ill.

(2) Proposed rates from Greencastle and Limerdale, Ind.

(3) Proposed rates from Ramona and Spencer, Ind.

*Via N. Y. C. R. R. (C).

70951. (a) Sand (except sand, moulding, bonded (naturally or otherwise) and except ground or pulverized sand),

in closed equipment or in open equipment with tarpaulin or other protective covering, C. L.; sand, molding, bonded (naturally or otherwise), in all kinds of equipment, C. L. (b) sand (except sand, molding, bonded (naturally or otherwise) and except ground or pulverized sand), in open top equipment, C. L.

Note—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in closed cars are to be assessed.

Establish on, from Koppel, Penn. (a), to Josephstown, Penn., 99c; Montour Jct. and Muse, Penn., 121c, and (b) to Josephstown, Penn., 88c, and Montour Jct. and Muse, Penn., 110c per net ton, subject to Ex Parte 148 increase.

70959. Crushed stone, in box cars, C. L., min. wt. 60,000 lb. Establish on, from Chicago, Ill., to South Bend, Ind., 143c per net ton.

70962. Crushed stone, in bulk, in open top cars only, and crushed stone screenings, in bulk, in open top cars, C. L. Establish on, from Maple Grove and Nardo, O., to St. Louis, Mich., 152c per gross ton, subject to Ex Parte 148 increase.

70973. Stone, crushed, in bulk, in open top cars, C. L. Establish on, from Speed, Ind., to Evansville, Ind., 127c per net ton, plus Ex Parte 148 increase.

70975. Sand, all kinds, and gravel, in open top cars only, C. L. (See Note 3), and in closed cars. Establish on, from Havens, O., to Marion O., 99c per net ton.

70993. Fluorspar, in packages or in bulk, C. L., ex-river, min. wt. 40,000 lb. Establish on, from Aliquippa, Allegheny (Pgh. N. S.), Bessemer, Colona, Etna, Glassport, Glenwood, Hays, Jct. Trf. (33rd St. Station, Pgh.), McKeesport, Mifflin Jct., Munhall (Kenny Yd.), New Kensington, Pittsburgh, Rankin, Roches-

WHY

you should specify

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Years of operating experience in many hundreds of plants and in many industries have been utilized to produce a screen which contains all these important features: Large Capacity, Positive Action, Durable Construction, Perfect Balance, Freedom from Blinding and Rubber Cushioned Power.

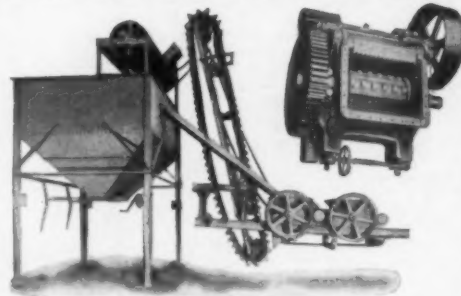
Users everywhere acclaim SIMPLICITY as the truly superior screen.

Our engineers will gladly study your particular screening problem and make a definite recommendation for its most practical solution. Read Bulletin No. 41.

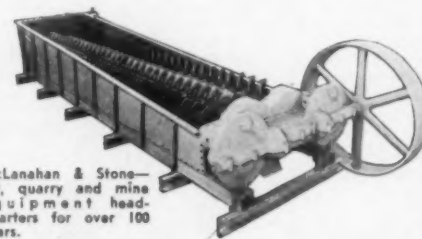
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McLanahan equipment will prepare your plant for more business. Single and double roll and jaw crushers, hammermills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, and hoists—complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.



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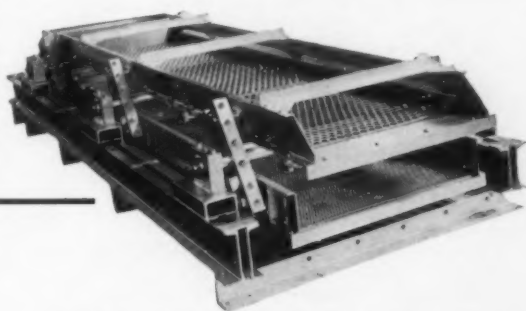
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The Double Feature Screen— For Sizing and Dewatering



The Hendrick Screen is the only one with two distinct actions . . . shaking and whipping. The screen arms are flexible, and the decks are free swinging—there is a whipping action at each reversal of direction. Operates in a level or uphill position. Perfectly balanced, no vibration.

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Faster—because Blaw-Knox buckets handle more pay load with less dead weight. And Blaw-Knox buckets have many such superior structural features as the rigid head to maintain cable alignment, prevent wear—and sealed ball-bearing sheaves in the lever arm to improve operating efficiency.

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ANY SIZE - ANY SHAPE
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H & K screens are produced to meet the most exacting specification and to serve well and long. Quality and workmanship are given first consideration.
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5650 Fillmore St., Chicago—114 Liberty St., N. Y.

ter, South Duquesne, Munhall, Penn., to Cornwells Heights, Penn., 440c per net ton, subject to Ex Parte 148 increase, via Routing Guide routes.

70998. Slag, crude (a product of iron or steel blast or open hearth furnaces), C. L. (See Note 3). Establish on, from Mingo Junction, O., to Troy, N. Y., 279c per net ton, subject to Ex Parte 148 increase.

71001. (a) Sand (except sand, molding, bonded (naturally or otherwise) and except ground or pulverized sand), in closed equipment or in open equipment with tarpaulin or other protective covering, C. L.; sand, molding, bonded (naturally or otherwise), in all kinds of equipment, C. L.; (b) sand (except sand, molding, bonded (naturally or otherwise) and except ground or pulverized sand), and gravel, in open top equipment, without tarpaulin or other protective covering, C. L. Establish on, from Cheswick, Penn., (a) to Erie, Penn., 176c; Lackawanna and Buffalo, N. Y., 220c and (b) to Erie, Penn., 143c; Lackawanna and Buffalo, N. Y., 204c per net ton, subject to Ex Parte 148 increase.

71002. Slag, commercial, crushed (a product of iron and steel blast or open hearth furnace), C. L., min. wt. 80 per cent of marked capacity of car; also sand, all kinds, and gravel, C. L. Establish on, from Hamilton, O., to Sharonville, O., 33c per net ton.

71019. Lime, common, hydrated, quick or slaked, Cancel motor truck competitive rate of 145c per net ton, min. wt. 50,000 lb., on, from Milltown, Ind., to Louisville, Ky., following rates to apply in lieu thereof: 176c per net ton, min. wt. 30,000 lb. On shipments loaded to a min. wt. of 50,000 lb., rate of 145c per net ton will apply. If rate of 176c per net ton, subject to min. wt. of 30,000 lb., results in a lower charge on any shipment than the rate of 145c per net ton, subject to a min. wt. of 50,000 lb., such lower charge will apply.

71023. Stone, rip rap, in open top cars, C. L. (See Note 3), but not less than 60,000 lb. Establish on, from Joliet and Thornton, Ill., to Dana, Ind., 11c per net ton, plus Ex Parte 148 increase.

71094. Stone, fluxing, furnace or foundry, melting or refractory (unburned), or chemical raw dolomite, in bulk, in open top cars, C. L. Establish on, from Maple Grove and Nario, O., to St. Louis, Mich., 152c per gross ton, subject to Ex Parte 148 increase.

71095. Sand (all kinds) and gravel, in open top cars, C. L. Revise rate on, from Cleveland, O., to Chardon, O., 94c per net ton, via B. & O. R. R. direct, subject to Ex Parte 148 increase.

Southern

28297 (carrier). Stone, crushed or rubble, C. L. Cancel rate of 85c cwt. from Boxley, Va., to Norfolk, Va., and Group, applicable via interstate route of ACL RR, also rates to intermediate points, permitting normal scale published in SFTB Tariff 388-E to apply.

28302 (carriers). Sand, moulding, C. L. Increase rates from E&OV stations to points in SFA territory 10c net ton.

28387 (carrier). Stone, C. L. Cancel rate of 90c net ton from Neverson and Rockton, N. C., to Havelock, Cherry Point, Morehead City, Edgewater and Beaufort, N. C., published in NS Ry. Rate Issue 395.

28394 (shipper; suggested by carrier). Crude tale, C. L., min. 90,000 lb. Establish 110c net ton, Marshall, N. C., to Marion, N. C.

28399 (carrier). Cancel rates on (a) sand and gravel, C. L., from Bunlevel, Pitt. N. C. to Chapanoke, Elizabeth City, Plymouth, Wendell and Zebulon, N. C., and (b) sand, C. L., from Goldsboro, N. C. to Elizabeth City and Plymouth, N. C., permitting normal rates to apply.

Southwestern

28300. Fluorspar, Brownsville, Eagle Pass, El Paso, Laredo and Presidio, Tex., to Atlanta, Ga. To establish on fluorspar, C. L., from Brownsville, Eagle Pass, El Paso, Laredo and Presidio, Tex., ex Mexico, to Atlanta, Ga., rate of \$8.80 per ton of 2000 lb., subject to Ex Parte 148 increase, min. wt. 80,000 lb.

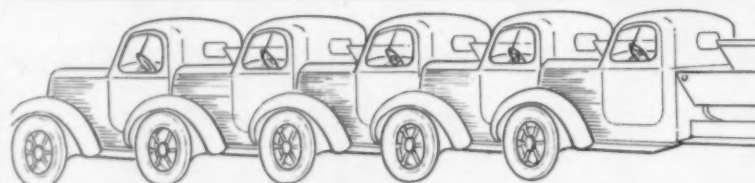
28311. Fluorspar, points in Illinois and Kentucky, to Bauxite, Ark. To establish rates of \$5 per net ton, min. wt. 80,000 lb., and \$5.40 min. wt. 50,000 lb., on fluorspar, C. L., from Kentucky and Illinois mines listed in Item 855 series of SWL Tariff 45-X, to Bauxite, Ark.

28457 (carrier). Sand, clay, gravel, crushed stone, jetty stone, C. L. Cancel rates published N. S. Ry. Rate Issue 395, NCUC 84, Goldsboro, Italy Hill, Rockton, Neverson, N. C., to Hertford, Belhaven, Columbia, Elizabeth City, Plymouth, Chapanoke, Edenton, Mackeys, Waddill, Morehead City, N. C., permitting mileage scales published SFTB 629B, NCUC 52, except rate of 85c net ton (subject to Ex Parte 148 increase) will apply from Neverson and Rockton to Elizabeth City, Edenton, Plymouth, Chapanoke, Mackeys and Waddill, N. C.

28501. Vermiculite, other than crude, from, to and between points in the Southwest. To cancel the Class 37½ and Class 40 rating on vermiculite, other than crude, named in Item 9240 of SWL Tariff 173-O, and corresponding items in other Committee and Individual Issues, and in lieu thereof establish Class 27½ rating, min. wt. 24,000 lb., subject to Rule 34. Subject to Ex Parte 148 increases.

Trunk Line

Sup. 1 to 40853 (shippers). Ganister rock, not ground, C. L. (See Note 3), from Barree, Brooks Mills, Harbison Walker Refractories Co. No. 16, Madley, Moore's Mill, Mt. Union, Port Matilda, Wolfsburg, Pa., to Ashtabula, O., \$2.58 per net ton.



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CONSERVE EQUIPMENT is the order of the day! When trucks are scarce, be sure to make every truck do extra service by mounting a LOAD LUGGER on the chassis. Use 5 to 10 buckets . . . loading, hauling and dumping continuously. You can increase efficiency 50% or more on material handling jobs where loading is done by hand. Try this faster, cheaper method for quarry work, road building, feeding crushers or loading open cars.



Brooks EQUIPMENT AND MFG. CO.

KNOXVILLE

808 Davenport Road

TENNESSEE

Distributors in all Principal Cities

FLINT PEBBLES

IMMEDIATE DELIVERY!

- ✓ Amorphous Flint
- ✓ Good Pebble Shape
- ✓ Equal in Purity, Wearing Quality, Shape, Color, to French Pebbles

Now available from domestic sources, these genuine Nodular Flint Pebbles are equal to the best imported pebbles. "Arley" brand Flint Pebbles are the only amorphous flint pebbles of high quality now on the American market.

Immediate shipment in all sizes from Laboratory to No. 5—either sorted, classified and cleaned—or at lower prices—in run-of-mine quality for ore and similar grinding.

WRITE for samples
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**THE RICHARD L.
CAWOOD COMPANY**

P. O. BOX 743 • EAST LIVERPOOL, OHIO

OSGOOD



TYPE 80 AIR CONTROL

The leader of them ALL for smooth, fast and efficient shovel, dragline or crane operation.

We have a brand new catalog
awaiting your request.

THE OSGOOD COMPANY
MARION, OHIO



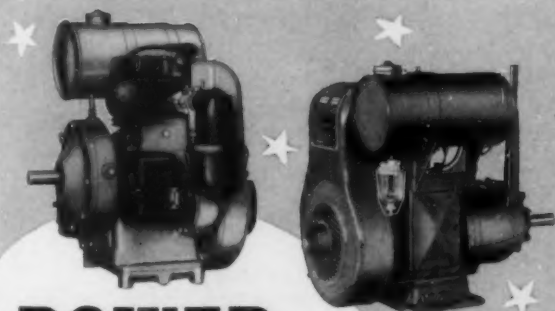
LOW-COST ACCURATE SCREENING

• Screening equipment is of first importance to National Pulverizing Co., Millville, N. J., whose product—silica sand—is accurately graded to seven sizes. Starting 15 years ago with 8 Link-Belt vibrating screens, they have since purchased 7 additional units. As in numerous other installations, Link-Belt vibrating screens have shown the way to accurate separation and lowest operating cost. The whole story of their economy and smooth, trouble-free operation is given in Book No. 1762. Send for a copy today.

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2045 W. Hunting Park, Philadelphia

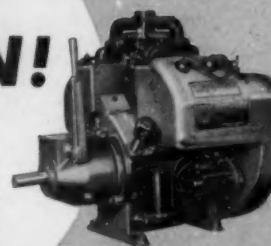
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TODAY!

LINK-BELT
Vibrating Screens

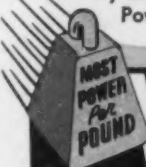


POWER to WIN!

• In terms of man-hours saved, and productive capacity of machines increased . . . Wisconsin heavy-duty air-cooled engines are supplying the United Nations and Industry-at-Large with the Power to Win!



A complete range of sizes, from 1 to 35 hp., 1 and 4-cylinder models. Specified as standard power equipment by more than 300 manufacturers.



WISCONSIN MOTOR
Corporation
MILWAUKEE, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

LOADER VALUE

is in what it costs per yard per 100,000 yards. On that basis a HAISS will prove out to cost you less than anything else we know of... Write for catalog.

2-3-5 and 8 YD.
CAPACITIES



HAISS
GEO. HAISS MFG. CO., INC.

Park Ave. & 143rd Street, New York, N. Y.

High-Capacity Screens

• Designed especially for damp, sticky, and fibrous materials—Speeds up production!

The W. S. TYLER Company
3613 Superior Avenue
CLEVELAND, OHIO • U. S. A.



OBITUARIES

GEORGE D. VAN SCIVER, director and former chairman of the board of Warner Co., Philadelphia, Penn., died recently at Tucson, Ariz., at the age of 80. He was born at "Breezy Ridge," a famous farm long owned by his mother's family at Hainesport, N. J. Because his father died when he was very young he was forced to leave school and learn a trade. His first job paid \$1.50 per week as machinist. During the early 1890's sand and gravel for construction purposes were being produced at "Breezy Ridge" by the Rancocas Sand Co. Several years later when that company failed and owed money to his mother, Mr. Van Sciver took over some of the equipment and decided to operate it. This was his entry to the business with which he was long identified and which he most successfully developed.

Mr. Van Sciver was also president and founder of the Knickerbocker Lime Co., which was combined with the Warner Co. in 1929. With increasing production and deliveries, in 1902 he organized the Hainesport Mining and Transportation Co., his first two river barges being named "Howard" and "Earl" after his boys. From that time on as opportunities were afforded he steadily expanded the business in the Metropolitan Philadelphia area. In 1929 Warner Co. acquired the entire holdings of these industries as they had been developed by Mr. Van Sciver. He held the position of director of Warner Co. from 1933 to 1942 and was chairman of the board during 1933 and 1934.

J. W. HERMAN, production manager, Atlanta Sand and Supply Co., Atlanta, Ga., was found dead recently on the floor of an electrically operated dredge at the company's sand pit near Gaillard, Ga. Mr. Herman was apparently electrocuted when he walked barefoot onto the damp floor of the dredge to start the pump. It is believed that because of a short circuit, he received the shock when he stepped on the moist floor. Mr. Herman was 53 years of age.

COLONEL JOSEPH HYDE PRATT, of Chapel Hill, N. C., professor of geology at the University of North Carolina, died recently at the age of 72. He served as secretary of the North Carolina Good Roads Association, and became secretary of the first state highway commission in 1916. Colonel Pratt, a consulting engineer and former state geologist, served as



Simple type of Sauerman Scraper System handles large stockpile of crushed rock at cement mill.

WHEREVER there is a problem of excavating from pit or bank, stockpiling, or other work involving haulage for any distance from 100 to 1500 ft.—it pays to find out what a Sauerman Slackline or Drag Scraper will do and what it will cost. Time and again a Sauerman machine shows a saving in comparison with any other equipment that will dig and haul an equal yardage under given conditions.

Write for Catalog

SAUERMAN BROS., INC.
530 S. Clinton St., Chicago

SAUERMAN
LONG RANGE MACHINES

FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants.

Engineering Service



EARLE C. BACON, Inc.
17 John St., New York, N. Y.

division engineer for the 105th Engineers in the 30th Division during the first World War. He also served as secretary of the North Carolina Good Roads Association, and became secretary of the first state highway commission in 1916. He was a graduate of Yale University, and a member of the American Society of Civil Engineers, the New York and North Carolina Academy of Sciences and many other organizations.

FREDERICK E. KURZ, central division manager for the Eimco Corp., Chicago, Ill., died recently at the age of 51. Mr. Kurz was a graduate of the Michigan School of Mines and had been actively engaged in the mining and filtration equipment fields during the past 25 years.

ROBERT F. RUNGE, vice-president of SKF Industries, Inc., Philadelphia, Penn., died recently at the age of 56. Mr. Runge was born in Woodbury, N. J. He was graduated from Drexel Institute in 1906 and went to work in the engineering department of the Hess-Bright Manufacturing Co., which later became SKF. His entire business career was spent with SKF and its predecessor. He became vice-president in 1920.

BURTON L. BOYE, president of the Asphalt Institute from 1933 to 1938, and formerly in charge of the asphalt department of the Standard Oil Co. of New York, passed away recently at Summit, N. J.

DAVE ROBBINS, partner in the firm of Valentine and Robbins, Sidney, Ohio, passed away recently at the age of 60. Mr. Robbins had been engaged in the manufacture of concrete products since 1926. The firm will continue under the direction of M. E. Valentine.

JOSEPH BANKS, founder and partner of The Banks Stone and Sand Co., and The Kelly Run Stone Co., Wilkes-Barre, Penn., died recently at the age of 63. The business will be continued by the surviving partners, B. C. Banks and C. J. Banks.

HERBERT BROOKS, JR., associated with Medusa Portland Cement Co., Cleveland, Ohio, died recently at the age of 47 after a long illness.

HENRY H. STEWART, assistant secretary and treasurer, J. K. Davison and Bros., sand and gravel dealers, Pittsburgh, Penn., died recently at the age of 61.

PULVERIZERS for the reduction of Cement Materials, Limestone, **Agricultural Limestone**, Fire Clay and All Dry, Refractory Materials.

Capacities: 1 to 60 tons per hour

Finenesses: 20 to 350 mesh

BRADLEY PULVERIZER CO.

ALLENTOWN, PENNA.

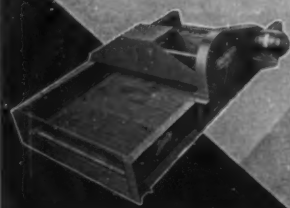
To Increase Capacities or Fineness of Present Grinding Plant—

To Reduce Power and Maintenance Costs—

To Insure an Absolutely Uniform Product—

Use the BRADLEY AIR SEPARATOR

Leahy
HEAVY DUTY



No-Blind VIBRATING
SCREEN with TRI-VIBE
—for Fine Mesh Screening

Powered for Maximum Production

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HEAVY DUTY

It's the controlled, positive vibration—triple-powered and engineered for greatest effectiveness—that gives the LEAHY Screen its remarkable degree of efficiency. It is the most modern screen on the market.

Vibrating Screen

Write for Bulletin No. 14H.

THE DEISTER CONCENTRATOR COMPANY
The Original Deister Co., Est. 1906

915 GLASGOW AVE.

FORT WAYNE, IND.

MODEL 51



BLAST HOLE DRILL
CRAWLER MOUNTED AND STABLE
IN TRACTION—Short moves can
be made with derrick standing.

The outstanding feature of this modern rock drill is its welded and riveted sturdy frame. Pounding down six inch holes in hard rock, gives a rock drill a lot of jolts—and that is why KEYSTONE engineers employed a combination of both welding and riveting to give it a rugged and durable frame foundation.

The working mechanism of the Model 51 crawler traction drill is likewise made to take rough service. Shafts and anti-friction bearings are oversized. The length and character of the stroke are adjustable to give greatest efficiency.

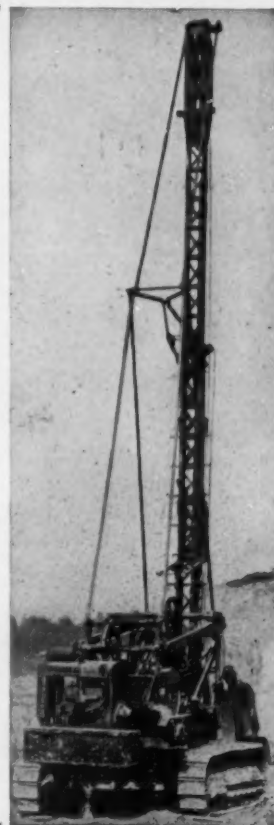
You can be sure of getting a superior piece of equipment that will give you dependable performance for years if you select a KEYSTONE Blast Hole Drill.

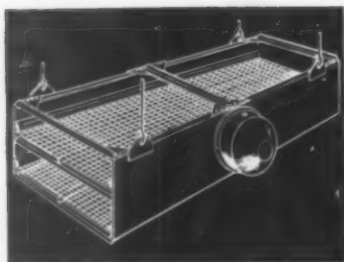
You will want to know more about it.

Write for Bulletin BD-1141.

KEYSTONE DRILLER CO.

Beaver Falls, Penna.





GYROSET VIBRATING SCREEN

5 DISTINCTIVE FEATURES . . .

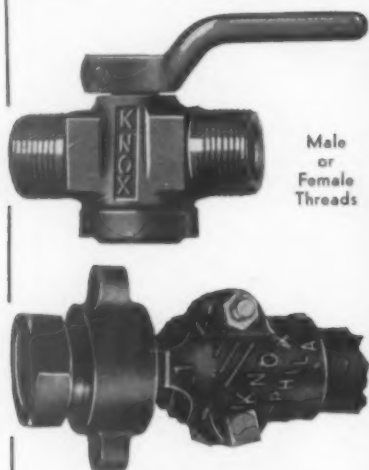
1. Full Floating Shaft.
2. Eight Positive Stroke Adjustments (quickly changed).
3. Oil Lubricated.
4. Sturdy Construction.
5. Screen Cloth Easily Changed.



LOW COST—EFFICIENT—
ECONOMICAL

Write for Bulletin No. 939

Productive Equipment Corp.
2926-28 West Lake St., Chicago, Ill.



Recognized Universally
as the **ULTIMATE** in
Valves and Couplings

**KNOX
MANUFACTURING CO.**

818 CHERRY ST., PHILA., PA.

Since 1911 Producers of

KNOX
Valves—Couplings—Nipples—Clamps—Menders

How Ball Bearings Are Made

SKF INDUSTRIES, INC., Philadelphia, Penn., recently issued an interesting folder describing the manufacture of ball bearings. Every step in the manufacturing process is described and illustrated, and the reasons are outlined for the special treatment required for some classes of service.

Manufacturers' News

Harbison-Walker Refractories Co., Pittsburgh, Penn., advises that Dale R. Torgeson has joined the research and development staff as chemical engineer.

The B. F. Goodrich Co., Akron, Ohio, announces that Dr. Harlan L. Trumbull, manager of the chemical research department, has been selected to head the new research project to study new sources of rubber. Dr. Trumbull is a member of the American Chemical Society and the American Institute of Chemical Engineers and has written and lectured on the rubber industry for the past 15 years.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has employed Dr. Ellis E. Jensen, executive director for Wisconsin of the National Conference of Christians and Jews for the past three years, as a research assistant in the industrial relations department.

The Buda Co., Harvey, Ill., announces the appointment of William T. Sanford as service manager of the railroad division. Mr. Sanford has had wide experience in engineering and field service.

Elastic Stop Nut Corp., Union, N. J., advises that Dan C. Hungerford has resigned as vice-president and director of the corporation, which he joined in 1936 as field engineer and, 18 months later, was made chief engineer.

Elwell-Parker Electric Co., Cleveland, Ohio, has announced the election of S. K. Towson as president and general manager, and W. A. Meddick as vice-president, following the passing of Morris S. Towson, former president of the company.

The Barnsley Phosphate Co., Inc., Wilmington, Del., has been granted a charter for land containing phosphate deposits. Capital, \$100,000. Principal office, Charles G. Guyer, Inc. Incorporators are L. M. Titter, O. B. Clayton, F. Farley, Wilmington.

Riverside Cement Co. of Delaware, Phoenix, Ariz., has filed an amendment to the articles of incorporation, changing its capital structure.

Equipment Corporation of America, Chicago, has just purchased a 250-ft. brick building to add to the facilities of their Chicago rebuilding plant. This will be used to house construction equipment and provide more room in their main building for machinery rebuilding operations. The newly purchased building in Chicago was acquired from the Allis-Chalmers Manufacturing Co. by H. M. Capron, president of the Equipment Corporation of America.

Twin Disc Clutch Co., Rockford, Ill., reports that R. M. Schaefer has been named vice-president in charge of the hydraulic division, all of the activities of which now will be concentrated in Rockford. Assisting Mr. Schaefer will be R. P. Exten, plant manager; J. R. Murphy, purchasing agent; and R. T. Rehwald, assistant secretary. P. H. Batten, one of the men who originally organized the Twin Disc Clutch Co. in 1918, is extremely active as the president of the company in Racine, Wis.

The Bristol Co., Waterbury, Conn., manufacturers of industrial process instruments and automatic control apparatus, has announced the appointment of Charles A. Mabey as director of the research activities of the company.

Stewart-Warner Corp., Chicago, Ill., advises that Lynn A. Williams, Jr., secretary and head of the company's legal department, was elected a vice-president of the corporation by the board of directors. In his new position Mr. Williams will continue all his former corporation duties.

Link-Belt Co., Chicago, Ill., paid tribute to the memory of James Mapes Dodge, one of the founders of the company, when June 30 was declared "James Mapes Dodge Day" and celebrated with fitting ceremony at the Nicetown, Philadelphia, plant. Mr. Dodge was chairman of the board of Link-Belt Co., with headquarters at the Nicetown plant, at the time of his death, in 1915, at the age of 63. June 30 marked the 90th anniversary of his birth.

Chain Belt Co., Milwaukee, Wis., has appointed the Sanford Tractor and Equipment Co., 500 East 4th St., Reno, Nev., as distributor of REX construction machinery in the state of Nevada.

H. K. Porter Co., Pittsburgh, Penn., has announced through T. M. Evans, president, the opening of a plant in Pennsylvania expanding their facilities in the war effort. The company's regular products include locomotives and a complete line of chemical processing equipment.

Worthington-Gamon Meter Co., Harrison, N. J., has elected Harry C. Beaver as president to succeed the late E. T. Fishwick. R. R. Anderson has been named vice-president and director, as well as retaining his office as treasurer. Mr. Beaver is also president of the Worthington Pump and Machinery Corp.

The B. F. Goodrich Co., Akron, Ohio, has announced the following changes in

MANGANESE STEEL CASTINGS

for
**PULVERIZERS
CRUSHERS
ROLLS
SCREENS**



for
**SHOVELS
DREDGES
CRANES
CONVEYORS**

The Frog, Switch & Mfg. Co.
Established 1881
CARLISLE, PA.

**HAYWARD
BUCKETS**

**WON'T QUIT
OR CAUSE TIME OUT**

A Hayward Bucket keeps the job
going ahead on scheduled time. It
won't quit or cause time out.

THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

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**You have to
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ROCK PRODUCTS
for Leadership
in the Industry**

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**RYERSON
CERTIFIED
STEELS**

10 Strategically-Located Steel-Service Plants

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot
Rolled Bars, Hoops and Bands, Beams and Heavy Structural, Channels,
Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw
Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets,
Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at
Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo,
Boston, Philadelphia, Jersey City.

**PERFORATED METAL
SAND AND GRAVEL SCREENS**

Manufactured exactly to your specifications

Any size or style screen, in thickness of steel
wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices

CHICAGO PERFORATING CO.
2437 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

**DENVER HYDRO-
CLASSIFIER**

The Denver Hydroclassifier is designed for fine
sizing and de-sliming
problems where it is es-
sential to reduce materials
to sizes minus 200 mesh
to 10 microns. Enclosed
integral lift vertical worm
gear drive makes it easy
to raise rakes. The spiral
rakes convey material to
center cone in shortest
time. Ask us how these
machines will save you
money. Write for bulletin
No. C4A-B.

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1400 Seventeenth St.
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**It's necessary to KEEP YOUR
SCREENS FIT, TOO!**

Freedom demands not only physical fit-
ness of our armed forces . . . but also
fitness of your Vibrating Screens pro-
ducing Rock Products materials used for
the War Effort.

UNIVERSAL VIBRATING SCREENS are
available for prompt delivery; so are
UNIVERSAL repairs and replacements.
Write us.

UNIVERSAL VIBRATING SCREEN CO.
RACINE - - WISCONSIN




personnel: V. I. Montenyohl, vice-president and a member of the organization for the past 35 years, has resigned because of his health; John S. Gullede, St. Louis district manager of the industrial products sales division, has resigned to enter the Army Air Corps. He is at present serving on the engineering staff at Wright Field, Dayton, Ohio. He will be succeeded by George Livermore, for many years special company representative on products for the oil pipe line and oil distributing agencies in the southwest; Robert T. Kain, sales engineer in the belting department, has resigned to enter the service of the U. S. Navy where he has been commissioned a lieutenant, junior grade. Lieutenant Kain is a graduate of the Naval Academy at Annapolis, class of 1921; L. H. "Larry" Chenoweth, manager of manufacturers' sales in the industrial products sales division, has been granted a leave of absence to serve

on the rubber products division of the War Production Board.

New Incorporations

Vacuum Concrete, Inc., a Pennsylvania corporation, has received certificate of authority to conduct a contracting and building business in Richmond, Va. Maximum capital, \$100,000. Central National Bank is the agent in charge of business. C. T. Corporation System, 123 South Broad St., Philadelphia, Penn., secured the certificate.

Salisbury Quarrying Co., Salisbury, N. C., has been incorporated with an authorized stock of \$10,000. Incorporators are B. F. Coggins and W. Herbert of Atlanta, Ga., Olin O. Rambo of Elberton, Ga., and George Wain of Salisbury, N. C.

Agricultural Lime Products Co., Havana, Fla., has been granted a charter to deal in lime products. Capital stock 50 shares, no par value. W. B. Bishop, L. B. Ellinor, and L. B. Ellinor, Jr., are the directors.

Salina Concrete Products, Inc., Salina, Kan., is the name of a new firm incorporated to conduct a cement business with a capital of \$25,000. V. B. Clements is the agent.

Sand and Gravel Supply Corp., Norfolk, Va., has been organized as a sand and gravel business with a maximum capital of \$35,000. Benjamin Restall, Brooklyn, N. Y., is the president, and James B. Denny, Dickson Bldg., Norfolk, Va., is the attorney.

Ada Lime Co., Inc., Ada, Okla., has been incorporated with a capital stock \$100,000. Incorporators are Pedro Simpkins, Howard W. Fleet, and Mary Simpkins, of Ada, Okla.

SERVING
THE CEMENT INDUSTRY
AND ALLIED LINES
IN NEW AND REBUILT
EQUIPMENT

KILNS, COOLERS, DRYERS,
CRUSHERS, TUBE MILLS,
CRANES, PUMPS,
MOTORS, GENERATORS AND
ELECTRICAL EQUIPMENT

Write us regarding the equipment you seek

WEBBER EQUIPMENT CO.

17 East 45th Street

New York

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You have to
look to
ROCK PRODUCTS
for Leadership
in the Industry

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Set in six-point type. Minimum \$1.00 each insertion, payable in advance.

INFORMATION—Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED—Displayed or undisplayed. Rate per column inch, \$5.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

**NEW AND USED PIPE
FOR EVERY PURPOSE
STEEL BOLTED TYPE BINS**

Jos. Greenspon's Son Pipe Corp.
National Stock Yds. (St. Clair Co.) Ill.

14 ton Vulcan loco, 36" gauge, steam.
1½ Yd. Northwest Shovel Attachment.
1½ Yd. B-Erie 41-B Shovel Attachment.
15 Yd. 2 Comp. Steel Bin.
Erie, 40 ft. crane boom.
3" Electric Pump, 75' head.
Compressors, 360', 500', 630'.
1½ Yd. 36" gauge dump car.
3—12 ton 36" gauge Whitcomb gas locos.
J. T. WALSH
Brisbane Bldg., Buffalo, N. Y.

FOR SALE

One Fuller Lehigh 48" screen type, coal pulverizer with drag feeder, and 8" type B Fuller Kinyon pump, but without motor—used less than one year. Address Box A-52, Care of Rock Products, 300 W. Jackson Blvd., Chicago, Ill.

EQUIPMENT AVAILABLE IMMEDIATELY

AT MIDDLE GRANVILLE, N. Y.

- 1—20" Allis-Chalmers Superior McCully Gyratory Crusher, feed opening 20" wide, capacity 125 t.p.h. at 3" setting, 275 t.p.h. at 5 1/2" setting, Shop No. 8311. With or without 125 H.P. 3/60/440 v. Slip Ring motor.
- 1—No. 4 Kennedy Gyratory Crusher, 8" feed opening.
- 1—Set 36" dia. x 16" Sturtevant Crushing Rolls.
- 2—Sets 40"x16" Colorado Iron Works Crushing Rolls.
- 4—Sturtevant Bucket Elevators, two steel encased, 36" c/c, 10x6" buckets.
- 1—Sturtevant Swing Hammer Mill.
- 1—70" Jeffrey Steel Pan Conveyor, 24" wide, steel frame.

AT WARREN, PA.

- 6—15" Steel Frame Belt Conveyors in 15' sections, 6" longitudinal channels, "Link-Belt" troughing and return idlers with anti-friction bearings, 85' long c/c with motor and reduction, gear drive—also 50', 100', 125', 150' and 185' lengths.

AT GLOUCESTER, MASS.

- 1—22"x50" Champion Jaw Crusher.
- 1—16"x20" Champion No. 1020 Crusher, with roller bearings.
- 1—3 compartment Blaw-Knox Bin, 75 tons, with Butler 3-beam weigher.
- 1—56"x100" Portable Steel Building.
- 2—20" Belt Conveyors—28' c/c, 52' c/c.
- 1—24" Belt Conveyor, 170' c/c.
- 12—Electric Motors, all 3/60/220 v.; 100 H.P., 75, 50, 30, 25, 15, 10, 5 and 3 H.P.



CONSOLIDATED PRODUCTS COMPANY, INC.

15-16-17 PARK ROW

NEW YORK, N. Y.

Shops and Yard at Newark, N. J., cover eight acres.

AT COLLINWOOD, TENN.

- 1—6"x22" Hardinge Pebble Mill, silex lined.
- 1—4"x20" Caldwell, double shell Rotary Dryer.
- 1—7500 gal. Horizontal Oil Storage Tank.
- 1—300 H.P. DeLaVergne Horizontal single cylinder Diesel Engine, Type GH, 165 RPM.

AT BELLEFONTE, PA.

- 1—5 roll Raymond High Speed Pulverizer, with vacuum separator, Raymond exhaustor, cyclone collector and inter-connecting piping.

AT NEWARK, N. J.

- 2—6"x16" Hardinge Conical Ball Mills, iron lined, including ball charge; one with 50 H.P. Slip Ring motor.
- 2—Direct Heat Rotary Dryers—5"x26" Ruggles-Coles, 6x24" Lancaster Iron Works.
- 2—Belt Conveyors—24"x105' c/c, 30"x132' c/c.

WE ARE INTERESTED IN THE PURCHASE OF THE FOLLOWING EQUIPMENT IN GOOD CONDITION.

- 1—4 ft. x 30 ft. Dryer (Rotary) in good condition.
- 1—24 in. by 36 in. Jaw Crusher.
- 1—Chain Roller Bucket Elevator, pitch ranging from 18" to 24".
- 35 ft. to 40 ft. centers, buckets 36" minimum.
- 1—Two deck Vibrating Screen 4 ft. wide x 8 ft. to 10 ft. long to handle heavy stone.
- 1—125 H.P. 220 volt; 3 phase; 6 cycle 1200 R.P.M. recent design in good condition.
- 1—Portable Belt Conveyor, 24" width belt, boom length 21 ft. Style R Wheel, belt speed 150 ft. per minute, mounted on wheel truck.

FOR SALE

- One General Electric Model No. 15 E-910 Type M.T.F. 553 Y. 3 phase; 60 cycles, 1165 R.P.M., 100 H.P. Complete with circuit Breaker Control grids, 2200 volts.
- One Dillon Boiler, Mass. Standard 1927, length shell 11 ft. Diam. Drum 50" Fire Tube Boiler.
- Two Worthington Oil Pumps, size 4 1/2 x 2 1/4 x 4" together with 2 super heaters, gauges, air chambers, and necessary piping.
- 1—36" Vertical Sturtevant Rock Emery Mill, No. 1014.
- 2—Hauke Oil Regulating valves (one used on Rotary kiln burner and one a boiler burner, together with piping for steam line and oil line).
- 1—Bucket Elevator, 40 ft. center. Size of Buckets 12 in. by 15 in.
- One Lambert Two drum hoist—5 ton capacity.
- One Two drum Lidgerwood Hoist size 9x10 equipped for electricity or gas engine.

ADDRESS—LEE LIME CORPORATION
LEE, MASSACHUSETTS

STRIPPING STEAM SHOVELS

Bucyrus, type 200B, 6 yd. bucket, 75' boom, 60' dipper stick.

Bucyrus, type 50B, 2 yd. bucket, 35' boom, 26' dipper stick.

Bucyrus-Erie Dragline, class 14, 2 1/2 yd. bucket, 87 1/2' boom.

All in good condition. Immediate shipment. Attractive prices.

THE INDUSTRIAL EQUIPMENT CORP.

P. O. Box 1647, Pittsburgh, Pa.
Warehouse: Carnegie, Pa.

NEED DUMP CARS? Immediate Delivery

- 14, 24-yd. Koppel
- 2, 20-yd. Koppel
- 3, 20-yd. Western
- 24, 16-yd. Western
- 12, 16-yd. Kilbume & Jacobs
- 62, 12-yd. Western

Illustrated specifications available
OTHER TYPES OF CARS TOO
Also Locomotives, Cranes, Shovels, Etc.
IRON & STEEL PRODUCTS, Inc.
13492 S. Braintree Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

New—RAILS—Relaying

ALL SECTIONS

Also contractors' equipment, "V" shaped and Western cars, 24 and 36-in. gauge, portable track, gas locomotives, frogs and switches. Attractive prices quoted. Wire, write or telephone for quotations.

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FOR SALE

Rebuilt Symons Impact Crusher, Size 30", Shop No. IM 30-5.

OHIO VALLEY SAND CO.

New Martinsville, W. Va.

CRUSHERS

GYRATORY: 42" Gates K. 30" Superior McCully (Like new), 20" Superior McCully, Gates Nos. 12, 10, 8, 6, 4, 3, 2, 1 (18 avail.) Tel-smith Nos. 4, 5, 6, 8C, 9 & 10. Also many Austins, Kennedys and Traylor's, many sizes.
JAW TYPE: Traylor 60x24, 48x20, 42x18, 36x16, 30x14, 24x12, 20x10, 18x8, 16x6, 14x4, 12x3, 10x2, 8x1, 6x1, 4x1, 3x1, 2x1, 1x1, 1/2x1, 1/4x1, 1/8x1, 1/16x1, 1/32x1, 1/64x1, 1/128x1, 1/256x1, 1/512x1, 1/1024x1, 1/2048x1, 1/4096x1, 1/8192x1, 1/16384x1, 1/32768x1, 1/65536x1, 1/131072x1, 1/262144x1, 1/524288x1, 1/1048576x1, 1/2097152x1, 1/4194304x1, 1/8388608x1, 1/16777216x1, 1/33554432x1, 1/67108864x1, 1/134217728x1, 1/268435456x1, 1/536870912x1, 1/1073741824x1, 1/2147483648x1, 1/4294967296x1, 1/8589934592x1, 1/17179869184x1, 1/34359738368x1, 1/68719476736x1, 1/137438953472x1, 1/274877906944x1, 1/549755813888x1, 1/1099511627776x1, 1/2199023255552x1, 1/4398046511104x1, 1/8796093022208x1, 1/17592186044416x1, 1/35184372088832x1, 1/70368744177664x1, 1/140737488355328x1, 1/281474976710656x1, 1/562949953421312x1, 1/1125899906842624x1, 1/2251799813685248x1, 1/4503599627370496x1, 1/9007199254740992x1, 1/18014398509481984x1, 1/36028797018963968x1, 1/72057594037927936x1, 1/144115188075855872x1, 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HYDRATORS
 8 Kritzer & Schultless Hydrators.

AIR COMPRESSORS
 BELTED: 355, 323, 276, 1000, 1300 & 1570 Ft.
 ELECTRIC: 478, 676, 867, 1302, 1722 & 2290 Ft.
 DIESEL: 608, 714, 1000 & 1300 Ft.
 PORTABLE GAS: 110, 160, 220, 310, 540 & 1300 Ft.
 STEAM: 49, 810, 823, 1300, 2200 & 3600 Ft.
 CLAMSHHELL BUCKETS, SKIPS & GRAPPLES
 Owen H. & S. S. Owen Grappler
 2 Yd. OWEN Type B Material Handling.
 1 1/2 Yd., 1 Yd. & 1/2 Yd. HAYWARD Class E.
 18 Steel Skips 6 1/2 x 8 x 3 1/2.
 5 Ton Bucyrus Rock Grabs.

CRANES AND DRAGLINES
 1/2 Yd. 5 Ton O & S 30 Ft. Boom.
 12 Ton NORTHWEST 50 Ft. Boom Gas.
 20 Ton LIMA, 750 Diesel, 65 Ft. Boom.
 25 Ton BROWNING & 28 Ton AMERICAN Loro
 25 Ton LINK BELT K-48 Electric, 70 Ft. Boom

CATERPILLAR SHOVELS
 1/2 Yd. Lima Diesel.
 2 Yd. Marion Steam Shovel.
 1/2 Yd., 1 1/2 Yd., 2 Yd. & 4 Yd. MARION Electric.
 1 Yd. NORTHWEST Gas.
 1 1/2 Yd. LIMA Diesel.
 1 1/2 Yd. BUCYRUS 41B Steamer.
 4 Yd. Bucyrus 120B Electric. Also 3 yd. Erie Elec.

DUMP CARS
 40-KOPPEL 1 1/2 Yd. 24 & 30 In. Ga. V Shaped
 15-2 Yd., 3 Yd., 4 Yd., 5 Yd., 12 Yd., 36 In. Ga.
 20-Bld. Gas 12 Yd., 16 Yd., 20 Yd. & 30 Yd. Cap.
 15-Bld. Gas 30 Ton Battleship Gondolas.

FLAT CARS
 9-30 ton sid. ga. heavy duty flat cars.

HOISTING ENGINES
 Gas: 15, 30, 60, 100 & 150 HP.
 Electric: 30, 60, 80, 100 & 150 HP.
 Steam: 6x12, 7x16, 8x20, 10x12, 12x14.

DIESEL UNITS
 75, 90, 100, 300 HP. D. M. Engines.
 110 HP Ingersoll Rand Engine.
 175 KVA Worthington 3/60/2300.
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BALL, ROD AND TUBE MILLS
 6x8 Pebble Mill & 5x5 Batch Mill.
 6'x22" HARDING LON. Dry Ball Mill.
 6'x22" HARDING CONICAL Pebble Mill.
 4'x22" HARDING CONICAL Ball or Pebble Mill.
 4'x22" & 10x22 Straight Ball Mills.
 4'x14, 5'x15 & 3'x22 Tube Mills & 4'x22'.
 3 1/2 x 8 & 3x7 Air Sweep Tube Mills.
 2'x4 1/2, 3'x12 & 5'x12 ROD MILLS.

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 JEFFERY 5x20 & No. 1 Sturtevant Hing Roll.
 RAYMOND Auto Pulverizer No. 0000, 0 & 3.
 RAYMOND Imp. Mills, No. 4, 32 & 38.
 GRUNDLER KXB Mill & Jay Bee No. 3 & 4.
 RAYMOND 4 & 5 ROLL MILLS & 5 ft. Chaser M.

STEEL STORAGE TANKS
 10,000 Gal., 15,000 Gal. & 20,000 Gal. Cap.

MATERIAL BIN
 116 Ton Blaw Knox 2 Comp.

400 BARREL CEMENT BIN
 400 Barrel Butler Portable Steel Cement Bin with
 Fuller automatic batcher, push button control.

SEPARATORS AND COLLECTORS
 8, 10 and 14 ft. Separators, Gayco & Bradley.

ROLL CRUSHERS
 36x60 Fairmont & 36x20 Diamond.

JAW CRUSHERS
 10x8, 12x7 1/2, 14x7, 15x9, 15x10, 16x9, 16x12, 16x14,
 18x11, 20x8, 20x6, 20x10, 20x12, 20x15, 20x15.30x13,
 20x15, 30x20, 30x18, 20x14, 20x9, 30x6, 30x10, 30x14,
 42x20, 48x24, 48x28, 60x25, 64x26, 36x14, 36x26.

CONE & GYRATORY CRUSHERS
 42 In. McCully Mammoth Gyratory.
 5 No. 18, 26, 37 & 48 Kennedy.
 18 In., 24 In., 30 In., 36 In. and 48 In. Symons Disc.
 4-10 22 Traylor 4 ft. Gyratory.
 6-No. 5, 3 & 6 Austin Gyratory.
 2-Traylor T-13 Building Gyratory, also 16 inch
 8 In. Traylor T. Gyratory.
 17 Gates K-Na. 3, 4, 5, 6, 7 1/2, 8 & 9 1/2.
 10 inch Austin Model 100.
 6, 10 & 12 inch Superior McCully.

SYNCHRONOUS MOTOR GENERATORS
 100 K.W. RIDGWAY 3/60/2200-250-275 volt.
 150 K.W. GEN. ELEC. 3/60/2200-250-275 v.
 200 K.W. RIDGWAY 3/60/2200-250-275v., 300 rpm.

SLIP RING MOTORS
 60 H. P. GEN. ELEC. 3/60/440 v., 1200 rpm
 (3) 100 H.P. GEN. ELEC. 3/60/440v., 900-1200 rpm.

CONVEYOR PARTS
 BELT: 1000 Ft. 60 In., 700 Ft. 40 In., 600 Ft. 36 In.,
 800 Ft. 20 In., 1645 Ft. 24 In., 517 Ft. 20 In.,
 297 Ft. 18 In., 600 Ft. 16 In., 300 Ft. 14 In.
 IDLERS: 54 In., 42 In., 36 In., 30 In., 24 In., 20
 In., 18 In., 16 In. & 14 In.
 Head & Tail-Pulleys-Takeup for all sizes
 Steel Frames: 3,000 Ft. 24 In., 30 In. & 36 In. Sections.

ROTARY DRYERS AND KILNS
 86 In.x20 Ft. 3 Ft. 20 Ft., 4 Ft.x20 Ft., 54 In.
 x 30 Ft., 42 In.x24 Ft., 5 Ft.x20 Ft., 5 Ft.x16
 Ft. 5 Ft.x20 Ft. 5 Ft.x20 Ft. 5 Ft. x 20 Ft.
 6 Ft.x20 Ft. 10x20, 7 1/2x100 & 8x110 Ft. Kilns.

STEEL DERRICKS
 GUY: 5 Ton 50 Ft. Boom, 15 Ton 100 Ft. Boom,
 20 Ton 115 Ft. Boom, 50 Ton 190 Ft. Boom.
 STIFF LEG: 5 Ton 70 Ft. Boom, 15 Ton 100 Ft.
 Boom, 25 Ton 100 Ft. Boom, 75 Ton 135 Ft. Boom.

LOCOMOTIVES
 GASOLINE: 3 Ton, 5 Ton, 8 Ton, 12 1/4 and 30 Ton.
 STEAM: 3 Ton, 5 Ton, 8 Ton, 10 Ton, 30 Ton & 30 Ton.
 ELECTRIC: 2 Ton, 5 Ton, 8 Ton, 40 Ton.
 DIESEL: 4, 8 & 15 Ton.

SCREENS
 VIBRATING: 2x4, 3x6, 12x3, 3x3, 4x5, 4x8,
 4x10, 4x25 & 4x12, 1, 2 & 3 Deck.
 HUMMER, ROTEX, NIAGARA & ROBINS.
 REVOLVING: 2x12, 3x16, 3 1/2x18, 3x24, 4x10, 4x20,
 4x22, 4x24, 5x26, 6x30, 6x20.

**TIDEWATER EQUIPMENT
 & MACHINERY CORP.**
 COMPLETE PLANTS BOUGHT AND SOLD
 Lincoln Bldg., 60 East 42nd Street
 New York, N. Y.

BUCKETS
 3-Blaw Knox 1 yd., 1 1/2 yd. and 2 yd.
 1-Hayward 2 yd.
 1-Saundersman 1 cu. yd. dragline bucket with
 chains and carrier.
 1-4 yd. cap. heavy duty dragline bucket.
 1-Hayward 2 1/2 cu. ft. orange peel bucket.

BELT CONVEYORS
 1-42" x 547 ft., 1-30" x 550 ft.; 1-36" x
 700 ft.; all roller bearing type with belt and
 motors.

BOILER
 1-100 H.P. Scotch Marine return tubular boiler.
 2-400 H.P. and 3-375 H.P. Water tube Boilers,
 150 lbs. steam pressure.

CABLEWAY
 1-15 ton capacity, length 1800 ft. between towers,
 150' high with hoist, carrier, cables, etc.

CARS
 12-4 yd. cap. all steel Rucker Dump Cars, stand-
 ard gauge.

GYRATORY CRUSHERS
 All standard makes Size No. 4, openings, 8 x 30
 to Size 21, openings 42 x 134".

JAW CRUSHERS
 8 x 16 up to and including 60 x 84.

CRUSHER SPECIALS
 1-Traylor 42" x 48" capacity per hr. 260 tons at
 8" or 118 tons to 5", manganese fitted, perfect
 condition, immediate delivery, Located Bangor,
 Maine.
 1-Allis Chalmers 24 x 30, used only three months.
 1-Symons 2' and 1-4' Cone Crushers, rears
 bowl.
 1-Buchanan and 1-Farrel 13 x 30.
 3-Traylor 12" x 16" gyratory.
 2-Allis Chalmers 6" and 10" Superior.
 1-Telsmith 16A Crusher.
 1-Acrme 14 x 26 Crusher.
 1-New Holland 7 x 12".

COMPRESSOR
 1-Ingersoll Rand 315 cu. ft. of actual air per
 minute, size 7 1/2 x 6 1/2 two stage, powered
 with diesel motor type H oil engine, model
 WBFH, size 6 1/2 x 8, with or without Mack
 truck with pneumatic tires.

DRAG SCRAPER & SLACKLINE
 2-Saundersman 2 yd. capacity Slackline and Drag
 Scraper outfit. Hoists have 150 H.P. motors
 direct coupled; also 110 ft. steel mast.

LOCOMOTIVE CRANE
 1-O & S 22 ton steam, std. gauge, 8 wheel,
 double drums for clamshell work, 5' boom,
 ASME boiler, 125 lbs. working pressure.

DERRICK
 1-15 ton all steel Stiff Leg Derrick, 75 ft. boom.

LOCOMOTIVES, STEAM AND GAS
 1-Baldwin 80 ton, six wheel switcher with tender.
 1-American 40 ton, 4 wheel, std. gauge, saddle
 tank, cylinders 14 x 22, 190 lbs. working pres-
 sure, ASME boiler; For Rent Only.
 2-Vulcan 32 ton, 4 wheel, std. gauge, saddle
 tank, air brakes.
 1-Vulcan 21 ton, steam, air brakes, std. gauge.
 1-Plymouth 12 ton gas.

LOCOMOTIVES, NARROW GAUGE
 2-45 ton Heiler geared locomotives, 36" gauge.
 8-Plymouth and Whitecomb, 4, 7, 8, 14, 16, 20
 ton; 24" and 36" gauge.

FIRE PUMP-UNDERWRITERS
 1-1000 GPM at 100 lb. pressure with 125 H.P.,
 220 volt, A.C. Motor and control.

DREDGE PUMP
 1-12" Morris, belt drive.

HOIST, SINGLE DRUM
 1-60" dia., 36" face, 150 H.P. slip ring motor,
 complete, new condition, immediate delivery.

STONE SKIPS
 Mteel, 7 tons cap., 5' x 8' top, 5' x 5' bottom,
 3 1/2' deep, with eyes for dumping.

SHOVELS AND CRANES
 1-P & H 700B Crane or Dragline with fairlead,
 60' boom, 125 H.P., 4 cylinder motor.
 1-P & H 1/2 yd. heavy duty Shovel and Crane.
 1-2 yd. Steam, full revolving, crawler tread.
 1-General 1 1/2 yd. Crane, 75' boom.

TRACTOR
 1-Cletrac 55 gas driven with angle dower.

SCREW WASHER
 1-Heavy duty single screw washer 20" flights with
 steel tub 28" wide, 12" long, new condition.

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CONCRETE EQUIPMENT
 Erie 100 ton 5 comp. bin with weigh batcher.
 B.K. 50 ton, 2 comp. bin with weigh batcher.
 Johnson Ready Mix Concrete Plant, 150 yards.
 200 ton rock storage bin, steel, heavy construction.
 Fuller Kingston bulk cement unloader, portable.
 Fuller 440 ton: air compres-sor, electric.
 Rex Pumpcrete Model 190 with pipe.
 Koehring 27E Paver, boom and bucket.
 Smith 27E Paver with 40 foot Tower.
 Hanscome 28-8 1 yd. stationary mixer, else.

SPECIALS!!!
 Derrick Boat equipped with 20 ton Wiley Whirley,
 100' bm., 12 x 12 Steam Hoist, Hull 33 x 114
 x 10'.
 Allis Chalmers No. 60 Tractor, gas with bulldozer.
 Cletrac Model 35 Tractor with bulldozer, gas,
 new 1941.
 Butler 16 cu. ft. Asphalt Pug Mill.
 2-Steel Stiff-leg Derricks, 10 tons, 100' bm.
 2-Steel Stiff-leg Derricks, 15 tons, 110' bm.
 Complete Conveyors, Steel Frames, 24", 30" & 36".
 Hardinge Conical Ball Mill, 4'x21".
 Sullivan Air Compressor 1001 cu. ft. P-Morse all
 engine.
 Allis-Chalmers cent. pump, electric, 3500 GPM.
 Lawrence cent. pump, Vortex, 8" Portable, gas.
 Worthington 8" cent. Bronze impeller, gas, port.
 Barnes cent. 8" pump, gas, portable.
 Gould cent. 8" pump, gas, portable.
 Dredge Pump 10" FH, cent. 200 HP AC motor.
 Head Forms 9000 ft., 10" x 6", 9" x 8", 8" x 8".
 Steel Pipe 14,000 ft., 2" - 2 1/2", 3".

CRUSHERS-CRUSHER PLANTS
 Gyratory crushers: K.V.S. 30, 37-8, 49; Telsmith
 22, 8A, 8B; Traylor 8"; McCully 12", 8", 8".
 Jaw: 6x12, 9x16, 10x20, 13x26, 18x30, 19x30,
 16x32, 24x36, 42x48.
 Complete Rock Crushing Sand & Gravel Plants.

BUCKETS-STONE SKIPS
 25-Steel stone skips, 2 to 3 yds.
 2-2 yd. Hayward Clamshell Rehandling.
 1-1/2 yd. Hayward Clamshell Rehandling.
 2-1/2 yd. Hais rehandling clamshell.
 1/2 yd. Hais rehandling clamshell.
 1/2 yd. Hayward orange peel, 3 leaf.

SHOVELS-CRANES
 Bucyrus Erie Model 1030 electric tunnel shovel.
 2-Marion Steam shovels, 1 1/2 yd. capacity.
 Bucyrus Erie 50B Steam Shovel, 2 yds.
 Marion Model 32 Steam Shovel, 1 1/2 yd. cap.
 Link Belt K42 Crane, gas, 1 1/2 yd. cap., rebuilt.
 Northwest Model 4, 1 1/2 yd. gas shovel.
 Northwest Model 105 1/2 yd. gas crane.
 Brownhoist Crane, gas, 40' boom, 1 yd. cap.

LOCOMOTIVES-CARS
 1-Vulcan 18 ton, 36" gauge, Diesel.
 2-Vulcan 6 ton, gas, 36" gauge.
 2-Porter 13 ton, Saddle Tanks, steam, 36" gauge.

RICHARD P. WALSH CO.
 30 CHURCH STREET NEW YORK

**LOCOMOTIVES
 SHOVELS-CRANES
 CARS**

1-50 ton American 4 wheel saddle
 tank, code boiler, standard gauge,
 being rebuilt.
 1-22 ton American 4 wheel saddle
 tank, code boiler, standard gauge,
 overhauled.
 2-40 ft. steel flat cars, 100,000 lb.
 capacity, cast steel "U" section
 truck frames, new decks, inter-
 change condition.

1-33 ton Standard Gauge Vulcan
 saddle tank, ASME code boiler.

Crane or Dragline Fronts for Marion
 37 and Bucyrus 50-B, One Each.

1-1 1/2 Yd. Rehandling Clamshell
 Bucket, Practically New.

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84" x 56" Allis-Chalmers Jaw
 Crusher No. 105 Austin Gyra-
 tory Crusher.

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AT FREDERICKTOWN, MO.

- 1—Denver Engineering Works Crushing Rolls 36" x 16"
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- 4—Steel Bins, 50 to 90 tons
- 4—Steel Storage Tanks, 6200 to 10,000 gals.
- 1—Hayward Clamshell Bucket, 1 yd.
- 1—Williams "2 in 1" Crusher
- 3—Austin Gyrotory Crushers, Nos. 3 & 5
- 1—Farrel 9" x 15" Jaw Crusher
- 1—Dodge 6" x 9" Jaw Crusher
- 1—Jewell Water Filtration Plant, 500 gpm
- 25—Centrifugal Pumps, 2" to 6"
- 1—Lidgerwood Shaft Hoist 5' x 3 1/4" drums
- 1—Dings Magnetic Pulley, 15"
- 1—Sturtevant Whip Tap Screen
- 1—Howe 100 ton Track Scale
- 1—Westinghouse Baldwin Mining Locomotive, 24" ga.
- 2—Shepard Electric Hoists, 1000 lb.
- 2—Worthington 4", 4 stage Centrifugal Pumps, 400 gpm
- 1—Wedge 7 Hearth Furnace
- 2—Chisholm, Boyd and White 4" Briquetting Machines
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- 1—Northwest, Model No. 5, Ser. No. 3572, 50' boom with 1 1/2 yd. pull shovel attachment.
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- 1—P&H, Model 650, Ser. No. 4173, with 40' boom and 1 1/2 yd. shovel attachment.
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- 1—Northwest, Model 105, with 45' boom. Ser. No. 1698 and 1 yd. bucket.
- 1—Erie, gas air, 1 yd., Ser. No. 9758, with 45' boom and shovel attachment.
- 1—Osgood Heavy Duty, Ser. No. 2069 and 40' boom, 1 yd. bucket and with 1 yd. shovel attachment.
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- 2—Martin Special wagons, with two sets of 4 wooden wheels, steel rims and steel artillery hubs. Cap. 15 tons.
- 1—Wooden body, 2 door dump on 2 wheel trucks. Mfg. Little Red Wagon Co. Body dim. 40" x 26" x 6 1/2".
- 4—La Plante Choate all steel 2 door bottom dump wagons mtd. on 4 wheel trucks, capacity 19 tons.
- 2—La Plante Choate all steel 2 door bottom dump mounted on 4 wheel trucks. Cap. 8 tons.
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SHOVEL AND PULL SHOVEL ATTACHMENTS

- 1—2 yd. Link Belt Shovel front for K-55 crane. Boom 30', stick 18' and 2-yd. dipper.
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- 2—1 yd. Shovel Fronts for model GA2 Erie gas air, boom 24', stick 17' with 1 yd. dipper.
- 1—1 yd. Shovel front for an Osgood crane. Boom 20', stick 15' with 1/2 yd. dipper.
- 1—1 yd. N.W. shovel front, boom 24', stick 13" with 1 yd. dipper for use on a model No. 105 N.W. crane.
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- 1—8x8x16" Used Attachment. 100.00
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- 2,500—8x16" Cast Iron Used Pallets, each11
- 4,000—4x16" Cast Iron Used Pallets, each11
- 1,200—12x12" Cast Iron Used Pallets, each11
- 1—No. 9 Jolietete Used Block Machine
- 5,000—8x16" Pressed Steel Cored Pallets for 1 1/2" face shell blocks, each25
- 5,000—12x16" Pressed Steel Cored Pallets for 1 1/2" face shell blocks, each25
- 2,000—4x16" Pressed Steel Cored Pallets for 1" face shell blocks, each17
- 500—3x16" Pressed Steel Cored Pallets for 1" face shell blocks, each10

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BESSER SUPER AUTOMATIC STRIPPER-FULL TOP PRESS VIBRATING MOLD BOX With

Attachments for making SIXTEEN SIZES, both 12", 16", and 18" lengths. All attachments for making full 12" x 18" pallet of material 12' long, off-bearing conveyor. Six month supply of Vital spare parts. All machinery complete with drive, and in excellent condition.

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3500—1/4" x 12 1/4" x 18 1/2" steel pallets.

If investigated promptly, this machinery can be seen operating to capacity. For information write:—

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20—58x12 C.F.	10—42x10 C.F.	200—28x8 S.F.	800—26x4 C.F.	100—20x5 S.F.	400—12x4 C.F.	200—8x3 C.F.
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CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top	Covers
48"	5	1/8"	1/16"
42"	5	1/8"	1/16"
36"	4	1/8"	1/16"
30"	4	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

TRANSMISSION BELTING

HEAVY-DUTY—FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	3"	4
12"	5	6"	6	4"	4

ELEVATOR BELTING

HEAVY DUTY RUBBER COVERED

Width	Ply	Top	Covers
12"	6	1/16"	1/16"
14"	6	1/16"	1/16"
16"	6	1/16"	1/16"
18"	6	1/16"	1/16"

ENDLESS "V" BELTS

"A"—WIDTH—All Sizes

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- 10 Ton Steel Hull Derrick Boat.
- Steel Hull Pile Driver.

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- 42"x150", 30"x100", 24"x60" belt conveyors.
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KNOCKOUT! HIGH SCREEN COSTS

USE CLEVELAND "ALLOY" WIRE SCREENS

25 YEARS OF EXPERIENCE DOES COUNT

THE CLEVELAND WIRE CLOTH & MFG. CO.

3574 E. 78TH STREET

CLEVELAND, OHIO



What Happens
When a
V-Belt Bends



FIG. 1



FIG. 2

Here is Simple PROOF of a **REAL SAVING** in BELTS, in RUBBER, in POWER

In two minutes you can prove for yourself a simple fact that will lengthen belt wear and reduce operating costs.

Pick up any V-belt. Bend it as it bends when it goes around its pulley. As the belt bends, grip the sidewalls with your fingers. You will feel the *sides* of the belt *change shape*. If the belt has *straight* sides, the bending will force those sides to bulge out—as shown in Figure 1 (on the left).

Now make this same test with a belt that is built with the patented Concave side. Again you will feel the sides change shape but with this *important difference*:—the Concave side becomes perfectly straight. This belt, when bent, takes a shape that exactly fits its sheave groove. (See Figure 2).

Here are the savings. First—no out-bulge of the sides means uniform sidewall wear—a saving in belts for you, a saving in rubber for the Nation. Second—the full side of the belt uniformly grips the sheave wall. This means heavier loads without slippage—a saving in belt wear and also in power!

Only belts built by Gates are built with the Concave side, a Gates patent.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

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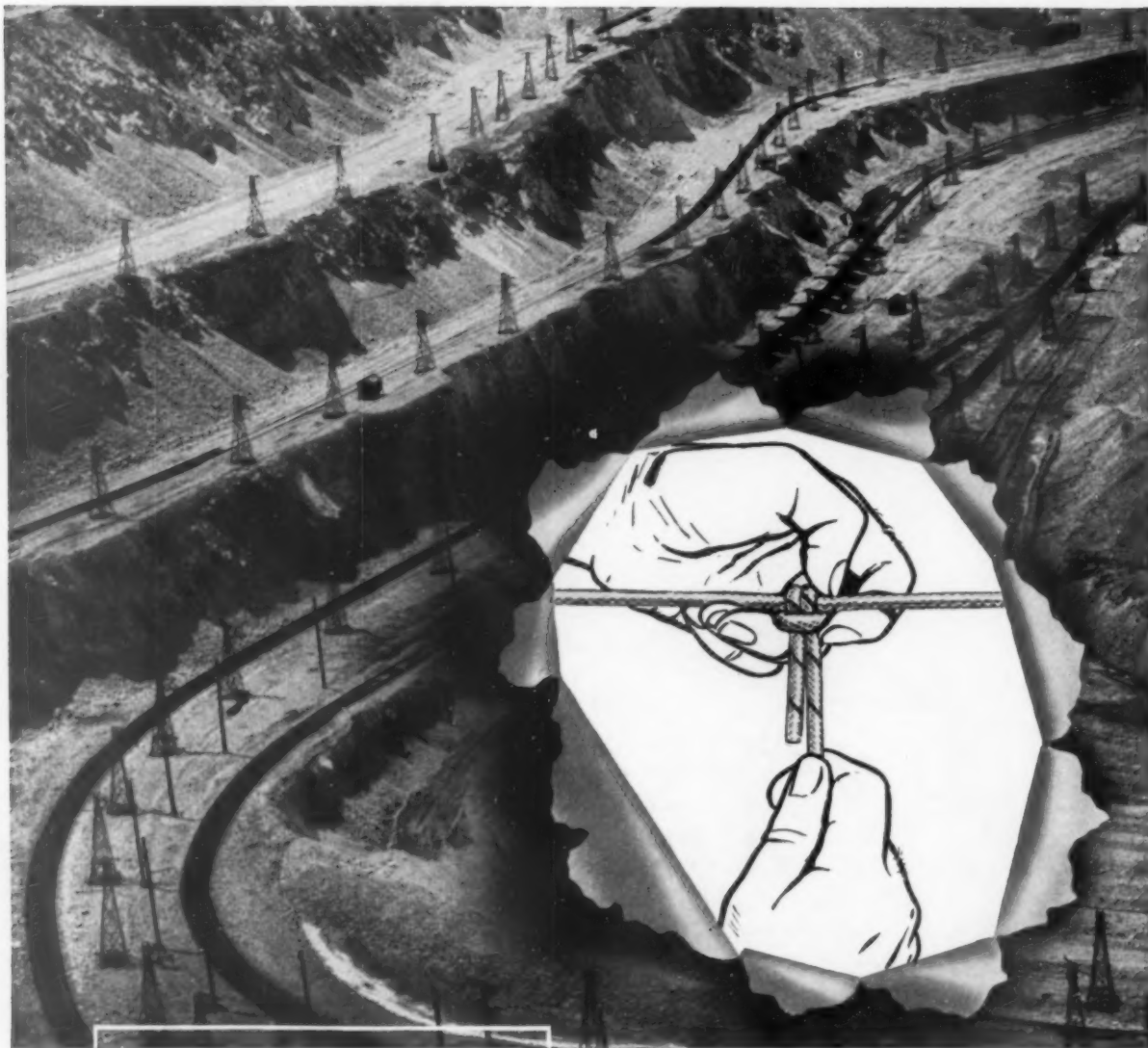
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**It takes this switch
at nearly
4 miles a second**

This half hitch knot is an important junction in the Primacord network. See that it's tied properly—so that the branch line is at right angles to the trunk line.

Once the powerful explosive force of Primacord has been released, it streaks through the

hookup like a bolt of lightning! It hits every switch, every cartridge in every hole—at 3.85 miles a second!

The tremendous shattering force created in a Primacord giant blast results in finer fragmentation, makes it easier to remove material. Time, labor and money are saved. For this and other reasons you'll find Primacord excellent for your work.

**THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT**

Manufacturers of Safety Fuse since 1836

PR-47

PRIMACORD-BICKFORD DETONATING FUSE

ROPE LIFE LARGELY DEPENDS ON THE OPERATOR

...Yes, even **TRU-LAY** *Preformed*



While American Cable **TRU-LAY PREFORMED** invariably lasts longer than ordinary non-preformed wire rope, it still is a precision machine made of steel (critical material) and subject to wear. Careful operators can make a wire rope last much longer, while inexperienced ones can quickly ruin it. Make sure your inexperienced operators know how to take care of wire ropes properly. Here are a few fundamental suggestions:

- ★ Inspect, clean and lubricate all wire rope regularly. Tighten fittings. Be sure hemp core is not dry, or corrosion or collapse may occur.
- ★ Be sure the rope is the proper one for the service. It should have proper strength, flexibility, resistance to abrasion, fatigue, crushing and heat. Consult your American Cable representative.
- ★ If drums or sheaves are small, or there is a tendency to whip or kink, specify **TRU-LAY PREFORMED**, the fatigue-resisting flexible rope.
- ★ Be careful of the fleet angle. If the rope deviates from the center plane of the sheave more than $1\frac{1}{2}$ degrees, undue wear will result.
- ★ Don't allow bad spooling on drums. Spaces between wraps, or crossed wraps, cause crushing and binding. **TRU-LAY PREFORMED** spools better than most ropes.

Conserve steel by making your present equipment last longer. Proper inspection, lubrication and maintenance will make long-life **TRU-LAY PREFORMED** last longer.

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles,
New York, Philadelphia, Pittsburgh, San Francisco

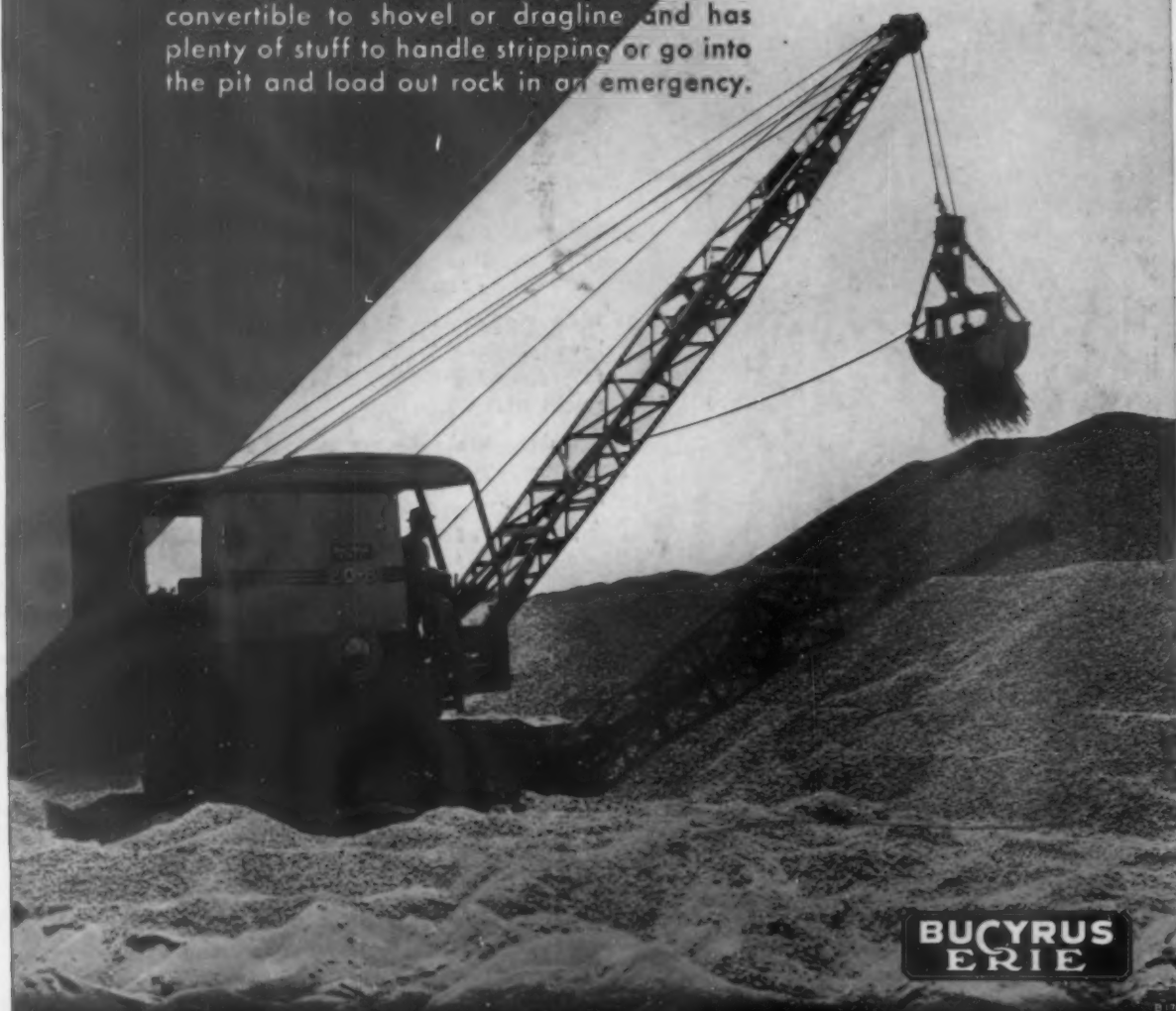
AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT • CONNECTICUT



ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

Savings on the Stockpile

Time-saving is especially important today, and there are many ways a $\frac{3}{4}$ -yard 20-B can save time for you. Here are some of them: It's fast on the swing and the hoist . . . It's not tied down to tracks but can move to any part of your plant in a hurry . . . It's economical to run and will stand up to tough 3-shift operation . . . High-speed independent boom hoist is standard . . . It's quickly convertible to shovel or dragline and has plenty of stuff to handle stripping or go into the pit and load out rock in an emergency.



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ERIE**

BUCYRUS-ERIE COMPANY

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